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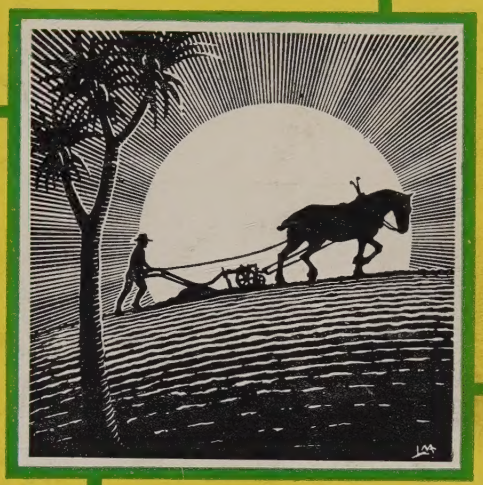

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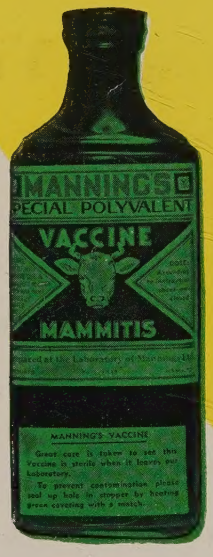

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Published by direction of the Hon. W. LEE MARTIN, Minister of Agriculture.

Vol. 60 WELLINGTON, MARCH 15, 1940. No. 3

Plough For Victory!

New Zealand's Agricultural War Effort Depends On Your Own Farm

R. B. TENNENT, Director of Primary Production, Wellington.

WHEN war was declared in September last, New Zealand farmers were commencing a new production year, and the programme which had been mapped out by individual farmers could not undergo substantial alteration. However, many farmers, with a quick grasp of their duty to the Empire, did make wonderful efforts to meet the call of the Mother Country for foodstuffs and raw materials. Many acres of land not intended for cropping were put under the plough for grain and root crops. In response to an appeal by the National Council of Primary Production a number of additional calves were saved, large areas of pasture were cut for hay and silage, and the appeals for the conservation of such requisites as sacks, etc., were not made in vain.

In spite of abnormal weather conditions there are indications that the results of the production year will be satisfactory. However, Great Britain's leaders are planning for a long war, and we, in turn, must make parallel plans. New Zealand sends a greater volume of butter, cheese, mutton and lamb to the United Kingdom than any other country, and the demand for these commodities is more likely to increase than diminish.

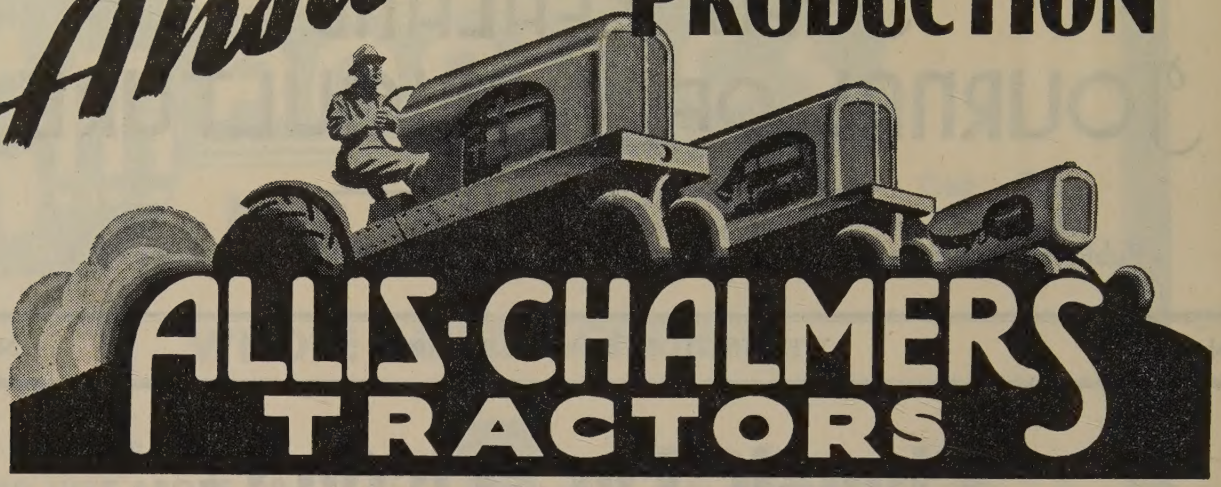
> "Every effort will be made to marshal our agricultural and pastoral resources to meet the needs of the Empire, but it is on the individual farm that the work will be done. Thus, our slogan should be—'A plan for every farm.'"

Feed the Armies

The armies of the Allies are growing steadily, and they must receive adequate supplies of food as well as the munitions of battle. Certain peace-time sources of supply are no longer available to Great Britain, and certain classes of foodstuffs are already being rationed by the Imperial Government. The rations laid down are adequate dietetically, but they show that the Home authorities are fully seized with the conservation of supplies.

Reports which have reached me show that the overwhelming majority of the farmers realise the issues at stake, and are fully seized with their responsibilities and duties in this momentous struggle to retain our economic and social liberties against a ruthless oppressor. The next step is to translate their responsibilities into practice. How can this best be done? This is the question that is being asked at meetings which are being held under the auspices of both the National and the District Councils of primary production.

The Answer TO THE DRIVE FOR INCREASED PRODUCTION



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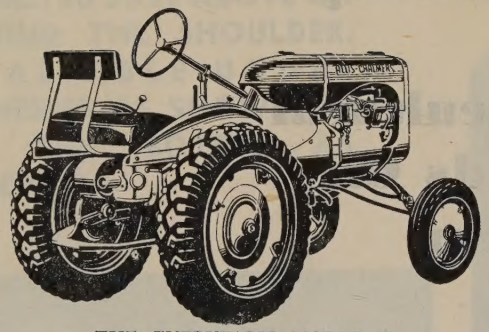

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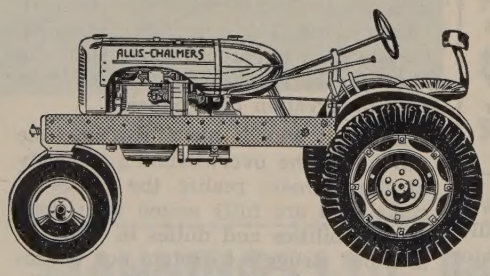

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Ask Yourself These Questions

It is obvious that no cut-and-dried programme can be laid down in a country like New Zealand, where there is a wide range of farming activities and farming conditions. To those seeking a lead, my advice is to survey your own particular farm, where no one knows the conditions better than yourself. Then ask yourself the following questions:—

"Are my pastures as good as they ought to be?

"Do I topdress adequately?"

"Do I save sufficient silage and hay and sow a sufficient area of roots to ensure that my sheep, my cows or my pigs are maintained in good condition?"

"In other words, is my farm producing to its highest capacity consistent with the maintenance of healthy flocks and herds, and the upkeep of soil fertility?"

The effort towards increased production must begin on the individual farm, and if every farmer makes some effort on his own holding the national aggregate will be truly formidable. For example, if the butterfat production of every cow were increased by 10 per cent., the national increase would be nearly 10,000 tons of butterfat. This increase is by no means impossible, and if plans are now formulated towards that end this objective would be achieved next season. Adequate feed supplies, which can be achieved by the fullest utilisation of the land, will ensure a longer and heavier period of lactation among dairy cows.

This fact is demonstrated in every farming district in the Dominion. There are instances where a farmer is obtaining 300 lbs. of butterfat per acre from his herd, while his neighbour under similar conditions is not obtaining half that amount. The difference in the quality of the stock sometimes supplies the explanation, but generally the disparity can be traced to the feed position.

Sow Only the Best

Sow only the best pastures, maintain them in good condition by managed grazing, and don't hesitate to put down special crops if you have the slightest doubt that your pastures and your hay and silage will carry your stock through the year in the best condition.

If you keep pigs—and every dairy farmer should—one acre of roots or lucerne to every 20 cows should be sown. The keystone of successful pig-keeping is the provision of ample feed in the winter months when milk supplies are not available. Barley is now cheaper than it has been for years, and pigs fed on roots, barley and meal in the winter months can be brought to profitable baconers by Christmas. It is only by wintering pigs that the dairy by-products can be fully utilised.

In the first three months of the war there was an air of uncertainty among pig-keepers, and many sows were withheld from the boar. In a few months pigs will be scarce, and farmers are urged to put every possible sow to the boar. Ten thousand litters will not be enough.

However, the wintering of pigs must be planned, and it is never too early to plan. Anticipate the feed requirements of your stock rather than find yourself caught with insufficient supplies.

Supplies of Feed

The provision of a plentiful feed supply applies to the sheep farmer with equal intensity. It is estimated that 10 per cent. of lambs die from lack of good feed or faulty management. The loss of these lambs not only decreases the farmer's returns, but, what is more important at the present time, it curtails the possible supply of meat to the British market. In other words, it is a double loss.

From time to time the National Council of Primary Production will issue advice to farmers. This advice will be given local application by the district councils, and every effort will be made to marshal our agricultural and pastoral resources to meet the needs of the Empire, but it is on the individual farm that the work will be done.

Thus, our slogan should be—"A plan for every farm."

The basis of that plan should be a plentiful supply of good feed for stock. In the fulfilment of this objective the plough and the topdresser are the implements of progress—

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Avoid Waste On The Farm

Greater Care Will Increase Production

— By —

C. WALKER.

Instructor in Agriculture, Hamilton

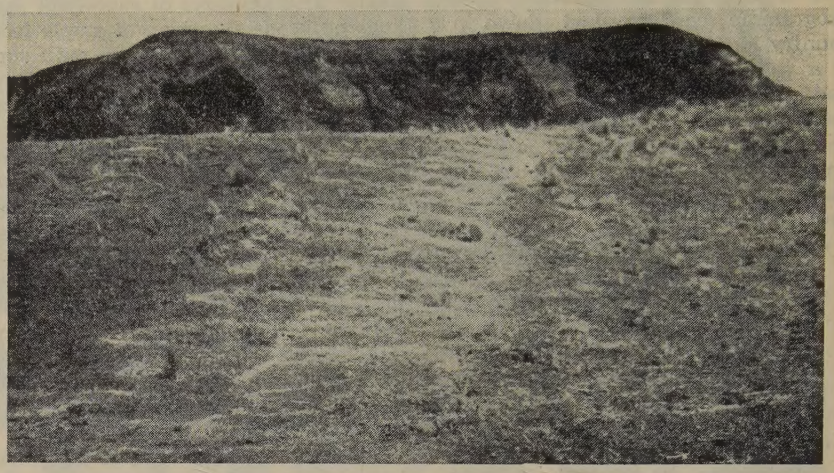

Fig. 1.—The result of contract topdressing.

ON every farm, no matter how efficiently it is conducted, there are directions in which waste or inefficiency can be eliminated. These may consist of cleaning up odd corners of scrub or weeds, draining and grassing marshy patches, using better seed, renovating, or renewing run-out pastures, employing better machinery, or taking greater care of what one has, or using fertiliser to better advantage. Many other avenues could be mentioned, but these will do for the present.

Throughout the Dominion farmers are anxious to play their part in the war by responding to the call for increased production. There are many difficulties to be overcome, but there is one direction in which every farmer can make a material effort towards an improvement in production—by DECIDING TO AVOID WASTE.

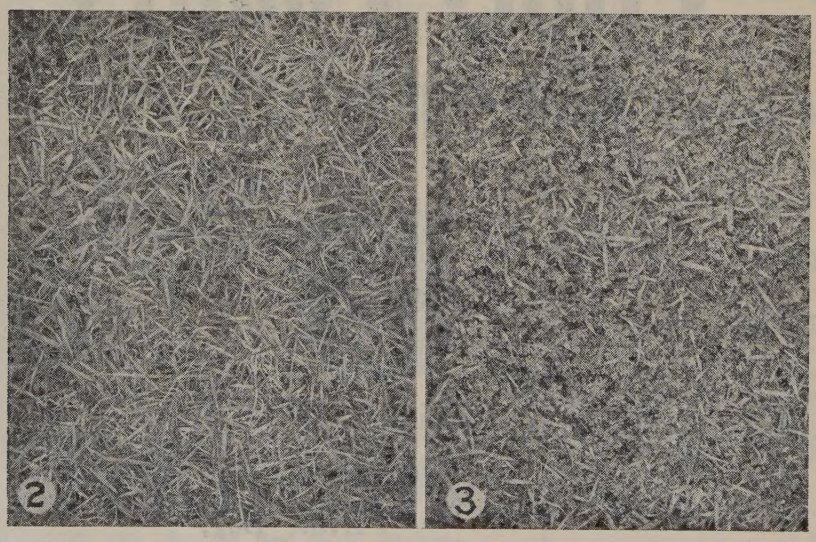

Fig. 2.—A sward sod-bound with *paspalum* and giving very low production.
Fig. 3.—The effect of 2 cwt. of superphosphate per acre. Note the amount of *lotus major* brought in.

Better Use of Fertilisers

On the question of fertilisers and their more efficient use, one could write a great deal. However, an examination of accompanying illustrations will serve to emphasise certain points.

While recently in the Rotorua district I saw extensive areas topdressed after the fashion depicted in Fig. 1. Here we see most inefficient utilisation of manure. Much of the pasture is entirely missed. A fraction is heavily manured. The resultant loss of potential production must be considerable. I might mention that this work has been done by contract. Obviously, if such a system has to be employed close supervision should also be provided.

Waste in the application of fertilisers is not always restricted to such an obvious example as this. Perhaps the greatest leakage in fertiliser consists of applying manures which do not add to production, or which, in themselves, have little value.

For instance, over much of the windborne pumice country of the central plateau and Bay of Plenty, phosphatic manures give excellent results in the early stages of development when used alone. If potash or lime are added, no improvement takes place. Obviously, then, saving can be effected by sowing only phosphates in such areas.

On many old volcanic soils, however, the opposite result is frequently obtained. Phosphates alone are fre-

quently ineffective, but give good results in association with lime.

Again, on other areas, such as parts of Taranaki and Waihi, phosphates and lime are not sufficient. Potash is also required for maximum results.

It would appear, therefore, that more discrimination in the use of fertilisers should be exercised. Where lime and potash are being used in small quantities on soils that do not respond to them, they should be reserved for other areas where their presence is essential. No district would suffer by such an arrangement, while, on the other hand, all districts would gain either from increased production or from the saving in cost of topdressing which would be effected.

Figs. 2 and 3 illustrate the excellent result obtained by using a moderate dressing of superphosphate on an old papsalum sward on wind-borne pumice land. No extra quantities of lime and potash could have improved this result.

Arrest Hill Country Deterioration

Throughout New Zealand much of our hill country is rapidly reverting to scrub, as is shown by the stages depicted in Figs. 4 and 5. A closer examination of the pasture on this country shows it to be very open with bracken beginning to re-establish. Figs. 6 and 7 illustrate this point.

Before new country is brought in as an effort towards improving production an endeavour should be made to hold and improve that which has already been grassed. On such country, as is seen in the illustrations, there is a complete lack of clover in the sward, and until some clover species is introduced no improvement may be expected. It would appear that some system of spelling for a season, associated with the sowing of subterranean or suckling clover and a little fertiliser, would materially assist in the renovation of this country.

Fig. 4.—The beginning of conversion. The pasture is mainly danthonia and browntop, with no clover.

Grass Mixtures Need More Thought

Where areas are to be sown down, much waste may be eliminated if a little more thought is given to the selection of species. In the first place, let me emphasise that the best quality seeds—that is, certified strains—are the cheapest buying when one considers value for expenditure. Cheap mixtures are always expensive in the end. Therefore, reduce losses and leakages at the outset by buying good seed.

In addition to this point, however, just as the indiscriminate sowing of fertilisers is wasteful, so also is the sowing of considerable numbers of species which do not suit a locality. Farmers would be well advised to discover which are their most suitable species and restrict sowings to these. For that reason, perennial ryegrass,

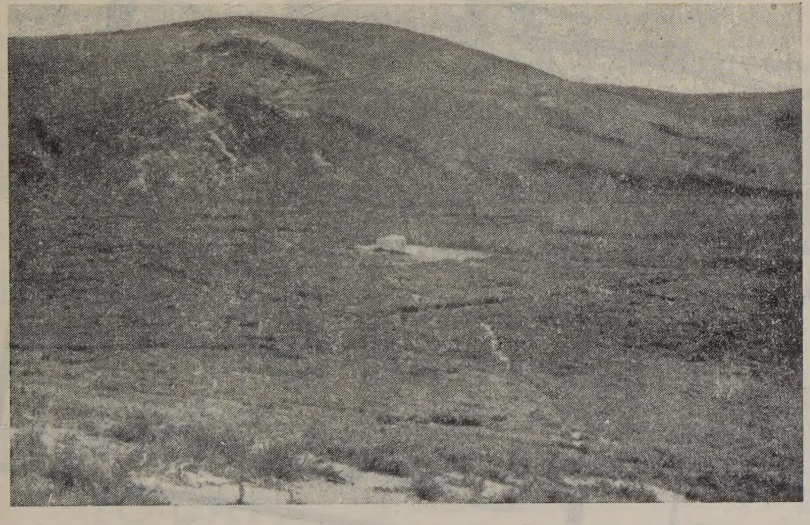

Fig. 5.—Land once in grass but now reverted to fern.

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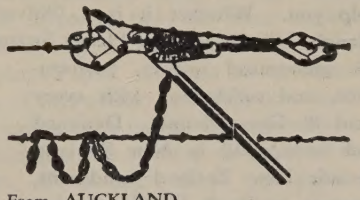

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white clover, cocksfoot, and paspalum should be the main species on most Auckland dairying soils. In fact, under most conditions, no other species need be considered. Thus, by reducing seeds mixtures to bare essentials, waste can be eliminated.

Figs. 8 and 9 illustrate results obtained from different sowings. In Fig. 8 the sowing consisted of more than a dozen species with no sound, sward-forming foundation. Consequently, after eight months the pasture was so open (as can be seen in the illustration) that it had to be ploughed and resown. A considerable loss was thus caused, not only in the cost of further seed, but in the unproductiveness of the field.

In Fig. 9 a simpler mixture of essential pasture species was sown. In this case there is a good establishment after the same eight-month period.

Control of Weeds

On few farms can it be said that there is complete freedom from weeds. Even where pastures are, generally speaking, in excellent order, there are often small corners, strips along streams or swamp edges, or uneven patches where such weeds as ragwort, blackberry, and gorse abound. By their occupation of land which would otherwise be producing butter, mutton, or arable crops, these weeds are to this extent reducing the possible production on those farms.

In fact, one might even claim that the losses are even greater, as the time devoted annually to their control could be more profitably employed on other productive work. Nor does this set out the complete loss, for, not only does the farmer spend much useful time in cutting and grubbing such weeds, but he may also lay out in cash certain sums for labour and materials in his struggle against weeds.

Losses are thus threefold—firstly, the land is unproductive; secondly, useful time is wasted; and thirdly, expense is regularly incurred in controlling weeds.

Insufficient thought is given to this problem on the majority of farms; otherwise more effective measures would be taken to check this source of leakage on the average holding. A policy of weed eradication is an urgent necessity, and should be prosecuted with all vigour.

In the accompanying illustrations Fig. 1 indicates to what extent ragwort can reduce production, while in Fig. 2 the results of cleaning up dense blackberry, as seen in the background, is well depicted.

Methods of eradication of the more common weeds have been advocated from time to time in recent years through this "Journal," so that there is no need to dwell at length in this article on the measures to be adopted. It should suffice, however, to say that full information can be obtained by reference to earlier issues of this "Journal" or to the local Instructor in Agriculture for the district.

Other Problems

In addition to the more common weeds mentioned, other problems confronting farmers in certain localities are the prevention of reversion from grass to bracken, manuka, piripiri, and hard or ring fern. In North Auckland and the wetter parts of the King Country and back country of Taranaki

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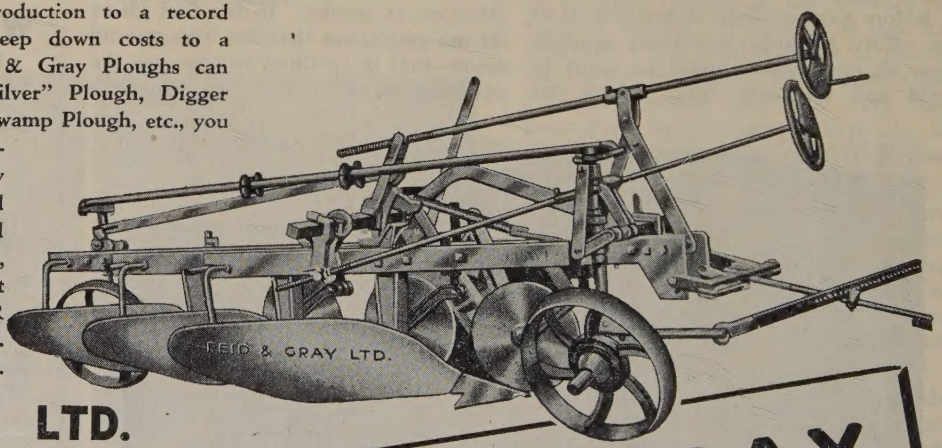

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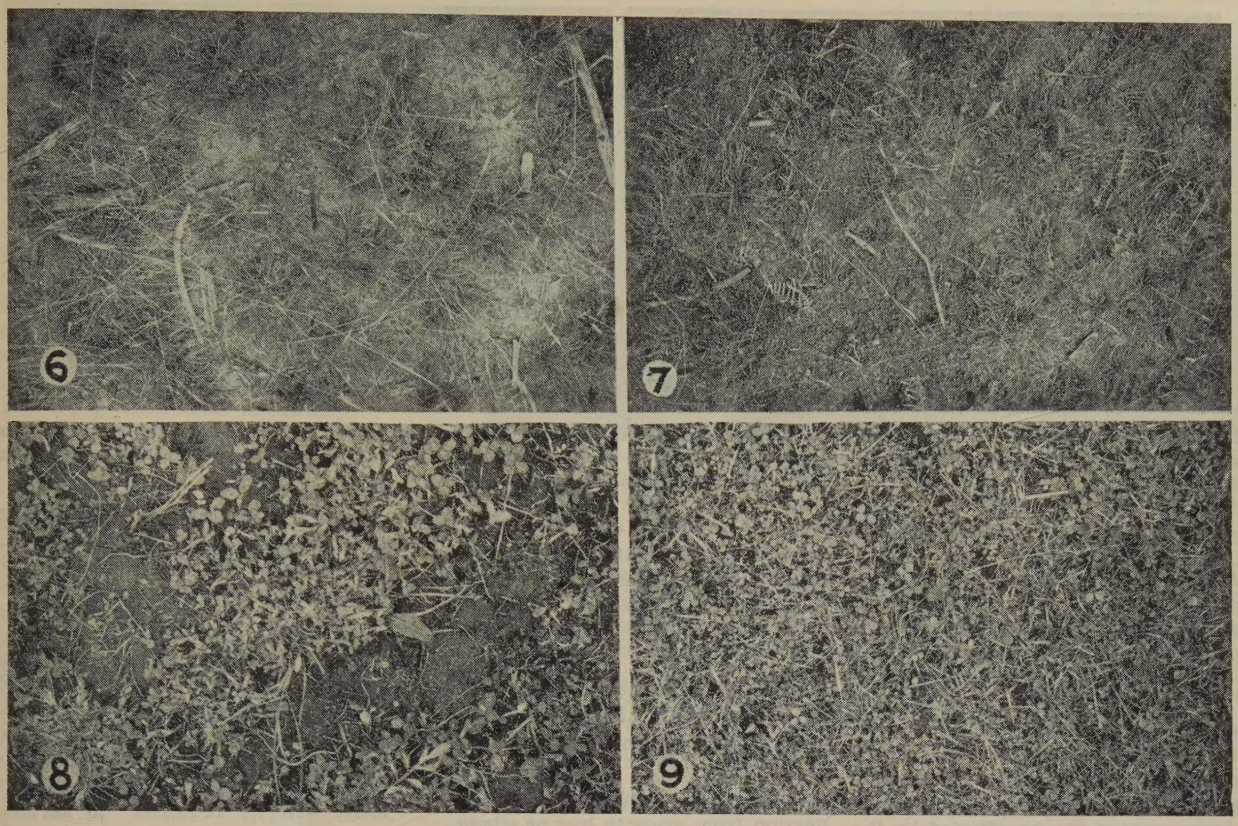


Fig. 6.—An example of land deterioration, with danthonia opening up. Note the extent of the bare ground. *Fig. 7.*—Land similar to that shown in *Fig. 6*, with bracken fern coming in. *Fig. 8.*—The indiscriminate sowing of many species. Red clover has smothered most of them. The pasture had to be ploughed up after eight months. *Fig. 9.*—A simple mixture of main species suited to the locality. Note the excellence of the sward after eight months.

the control of this growth is a question of major importance.

The limiting factor on most holdings is the necessary finance to permit of adequate manuring, subdivision, and stocking. Without the means to carry out this programme it is apparent, from past experience, that the rate of deterioration will accelerate. It therefore appears that some early classification of this country is urgent. Certain areas which are of low fertility or are too difficult to hold should be returned to forest, while on other sections, where the land warrants development, some national scheme should be inaugurated to save those areas from ultimate deterioration.

I mention a national or State scheme because it is very apparent, apart from a few isolated instances, that the present occupiers are quite unable to finance a full programme of development. Much of this country is excellent for breeding purposes, and is vitally necessary for the production of a full supply of store cattle and sheep, which may be topped off on the better farm lands in other parts of the country. In fact, this high country plays an important part in this direction in maintaining the production of the Dominion.

DELAYS *are* DANGEROUS
EFFECT That POLICY
with the
GOVERNMENT LIFE
TO-DAY

Better Drainage

There are few farms where certain areas could not be made more productive by a system of drainage. Odd gullies, marshy patches, arms of swamps, etc., are not producing to full capacity on many holdings. Even where the greater portion of a farm is well developed these patches are not uncommon.

Quite naturally—and, without doubt, quite correctly too—the areas capable of being rapidly brought in have been developed first. In spite of the soundness of this policy, however, one should not call a halt before an extension of development is made to all parts of the farm. Frequently, these wet patches are potentially rich farming areas, merely awaiting drainage as a preliminary to development and high production.

On occasions, certain marshy patches are incapable of drainage, but this fact should not preclude development along other lines. Generally, such areas are covered in vegetation of little or no economic value. However, with such useful species as *Glyceria aquatica*, *Phalaris arundinacea*, and Mercer grass available for just such areas there is no good reason why they should continue to be unproductive.

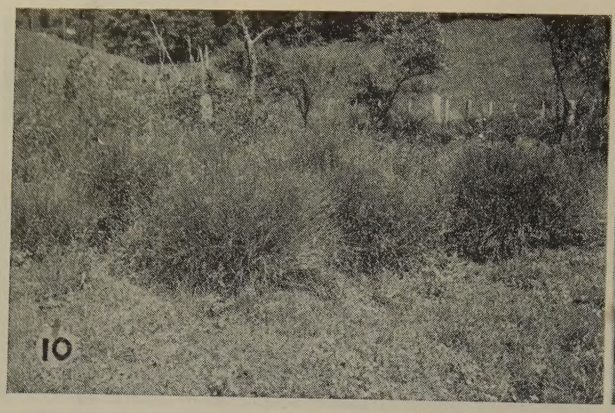


Fig. 10.—These spots breed weeds for the farm. The cleaning of such places will not only enhance their appearance, but will reduce work in weed eradication elsewhere. *Fig. 11.*—Ragwort infestation of pasture. In the foreground a cultivated flat has been invaded by the weed.

Better Utilisation Of Surplus Feed

Our experiences last summer and during the winter should be sufficient warning that a more adequate supply of feed reserves is absolutely essential in any scheme aiming at higher production. Fortunately, so far as northern districts are concerned, this object can be achieved without any expensive outlay in crops. In fact, a great deal of improvement can be effected by the full utilisation of the surplus grass growth which is so abundant during late spring and again in the autumn.

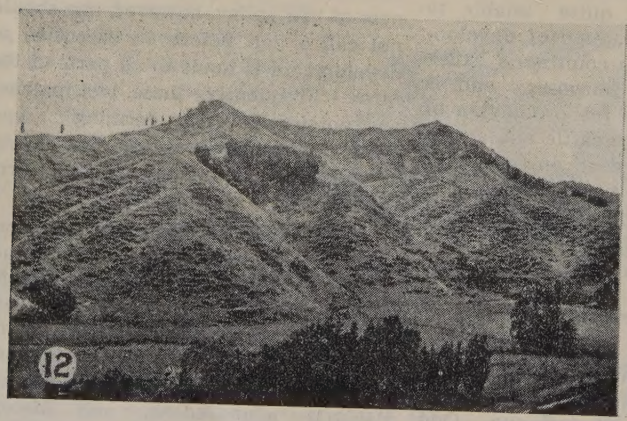
In the past it has not been uncommon to find large areas of grass being virtually wasted at these periods, while at others—and notably during the winter—stock have been undernourished. Statistics show that the amount of hay saved provides only 5 cwt. per annum for every dairy cow. Even on a conservative basis satisfactory feeding through the winter demands that at least three times this quantity should be fed. Furthermore, when one considers that much of the hay is of inferior quality, it will be apparent that at least a ton per cow per annum should be saved. The provision of this quantity is not difficult, as the material is available in every normal year, and merely requires conversion from grass to hay or silage.

Important as this question may be—and it is indeed very important at the present time when other forms of stock feed may not be procurable—the very process of removing surplus growth as hay and silage reacts very favourably upon the pastures concerned. Under heavy growth the bottom grasses and clovers are smothered, whereas when this material is removed they recover rapidly. Thus, the saving of extra supplies confers a double benefit on the farmers concerned.

Protection of Implements And Farm Machinery

At the present time the replacement of farm machinery is not easy. With war developments probably restricting or even preventing the importation of implements and parts, it is very apparent that the present supplies of equipment will be required to serve for much longer periods than usual. Farmers would therefore be well advised to keep that point in view.

Naturally, perhaps, it will at once occur to the majority that the first requirement of farm machinery is adequate housing. This is very important. Exposure to the elements throughout the year takes heavy toll of every piece of equipment, far heavier toll, in fact, than all the work that such equipment performs in a normal year. Adequate



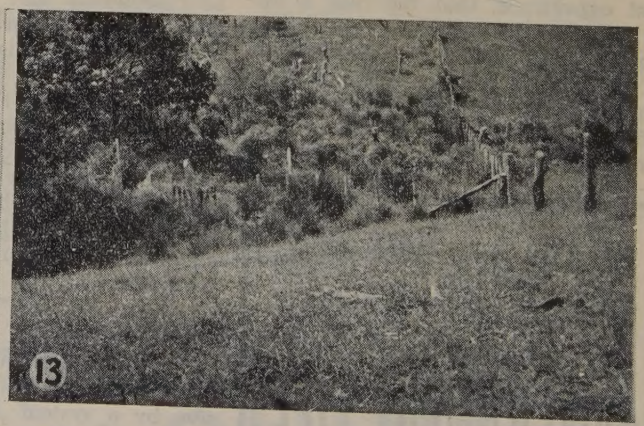


Fig. 12.—Hard fern presents a serious problem on high rainfall hill country. Note the extent of invasion on a southern King Country farm. *Fig. 13.*—A corner such as this is often allowed to remain idle through poor drainage. Planting in pampas grass, or even *glyceria aquatica* if very wet, would be wiser than leaving the area as it is.

housing, on the other hand, will greatly prolong the life of machinery, and thereby reduce expenditure quite appreciably in this direction.

In addition to housing, however, it is well to realise that all equipment should be stored in good condition, with working parts well oiled or greased as an extra protection. On the average farm ample waste oil will be available for smearing all bright surfaces, such as mould boards of ploughs, scarifier points, disc blades, etc., thus ensuring that they will not deteriorate, and that they will be in good working order when next required.

Fig. 14.—Strong-growing blackberry is beyond the fence in the background. The foreground was in the same condition until steps were taken to eradicate this weed.

Conclusion

In the foregoing observations I have endeavoured to set out a number of directions in which attention to certain points would lead to either reduction in losses or actual increase in production. To the farming community many others will occur. For instance, the better subdivision of farms to utilise fully the production of grass, the better employment of labour, and the use of labour-saving machinery, and the improvement of herds and flocks by the employment of better breeding stock might all be cited as further ways and means of improving the farm position.

However, if the article has stimulated interest sufficiently to cause thought to be given to further directions in which savings can be effected, then I feel that it has served its purpose. It will rest then with those actively engaged in the industry to carry out such measures as would apply to their particular holdings.

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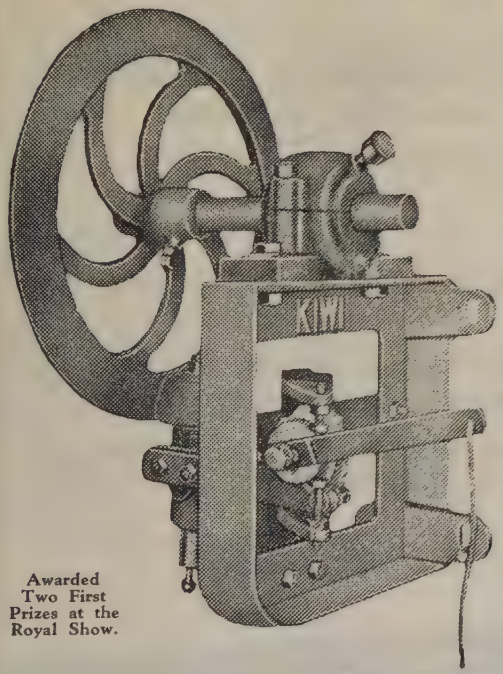

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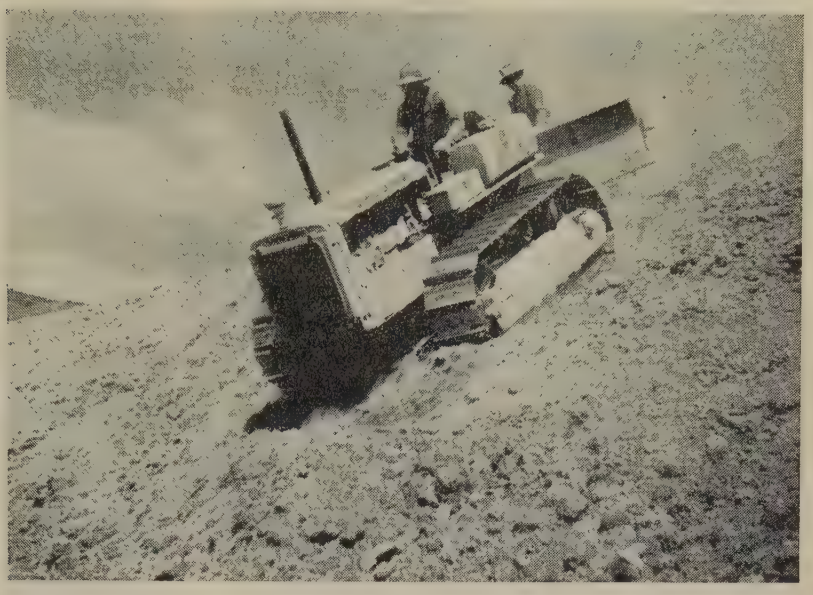
Improvement Of Hill Country Pastures By Cultivation

Method Used by Wairarapa Farmer

— By —
N. LAMONT,
Instructor in Agriculture, Masterton.



Really steep slopes are best tackled at right-angles to the slope.
[*N. Lamont, photo.*

THE approach to the problem of hill country pasture improvement has, in general, been restricted by the fact that, with the limited exception of burning, it is not possible to provide a seed-bed for the reception of phosphate responsive species. Any attempts to introduce such species have, in consequence, been limited to surface sowing—frequently on most uninviting situations, but, nevertheless, satisfactory in many instances and sufficiently encouraging to warrant the extension of these practices on our steep and broken country.

The development of modern tractors has, however, considerably advanced the "ploughing front" into country previously considered unworkable, and as a result, large areas, genuinely worthy of the name hill country, can be cultivated, if not with the mouldboard plough then with "giant" discs, and worked down to a seed-bed every bit as "tilthy" as those obtained on easier country.

This is a practice which is being investigated by a number of farmers in the eastern hill country of the Wairarapa, and results to date have been distinctly promising. Fig. 1 shows such an area ready for sowing, and clearly illustrates in the foreground the hard type of country that is being

Modern tractors have made possible the improvement of hill country pastures by cultivation. An indication of what can be accomplished is given by the experiences of a Wairarapa farmer.

treated. The previous vegetation, as shown, is principally stunted manuka, and the sward is poor and open and consists of danthonia and sweet vernal.

Giant Discing

Although they vary, the practices described in this article are those which appeal to the author as being the best and those which have also been demonstrated as effective. The first cut with the giant discs is probably the most difficult of all the operations, and is the one requiring the greatest skill and care on the part of the tractor driver.

The heavy discs, often weighted with a box of earth (see Fig. 2), function satisfactorily under the quite dry conditions which are necesssary before the tractor can work on steep sidings, without dangerous side-slipping. Incidentally, it might well be mentioned here that attachments designed to prevent side-slip have been considered highly inadvisable, as it is felt that this slipping can be regarded as a safety measure more often than not, being obviously much preferable to overturning.

It is the presence of wash-outs, sheep tracks, etc., that make this first cut so difficult, and a great deal depends on the skill of the driver in chopping down hummocks, etc., in preparation for succeeding rounds.

Long Fallow

Although success would no doubt result from other practices, the author feels inclined to endorse the procedure adopted by Mr. H. Martin, of Otaraia, whose scheme included a long fallow period following the initial discing. One feels convinced that the months of weathering preceding the final working up played a big part in ensuring the final perfect strike of seed and outstandingly vigorous growth of grass.

The point which struck the author most when Mr. Martin's first area was inspected was the dark green colour of the new grass, denoting health and vigour, and surely due to ample supplies of soil nitrogen. A matter of inches away, the original sward remained stunted and yellow. Indeed, some authorities do consider that a

soil accumulates nitrogen available for plant food as a result of a bare fallow, but, whatever the explanation, one could not but be impressed by the vigour of the new grass and feel convinced that it was due in part at least to the ten months' fallow preceding sowing.

Consequently, one cannot but commend the practice of Mr. Martin, who carried out the initial discing during May in anticipation of sowing the following February.

Final Preparation of Seed Bed

Following the initial discing and long weathering, Mr. Martin found that a good seed-bed could be obtained fairly readily with one further "giant" discing and one harrowing—the harrows also being worthy of the term "giant." It is, of course, quite impossible to use a roller on most of this country, and consequently the seed-beds appear rather loose for sowing. It must be remembered, however, that in one respect the chopping action of the discs has an advantage over a mould-board plough in that there is no turf layer turned under. On the contrary, the seed bed "knits" thoroughly with the sub-soil.

Seed

It cannot be questioned that if one goes to the expense of cultivating country of this kind it is sheer folly to attempt economy by sowing so-called "cheap" seeds mixtures, one simply could not afford anything less than certified quality. The foundation of the mixture should be certified ryegrass, dogstail, subterranean clover, and certified white clover. Cocksfoot, red clover, etc., may be added, but it is doubtful whether the mixture can be improved thereby unless special conditions justify them.

On present knowledge, therefore, one would recommend:

25 lb. certified perennial ryegrass.
3 lb. crested dogstail.
4 lb. subterranean clover (Mt. Barker).
1 lb. certified white clover.

Should anyone feel that such a mixture is unduly expensive, I can do no better than refer them to the first page of the "Journal" for August, 1939.

Manuring

Neither should manuring be stinted. At least 3 cwt. per acre of superphosphate (with lime where necessary) should be applied with the seed, and one would like to see this amount increased in order to ensure that the all-important foundation for a good pasture is well and truly laid. For the same reason, topdressing should not be grudged during the first years of the pasture's life, for it should be born in mind that one is topdressing a sward consisting, in the first year or or two at least, almost entirely of ryegrass and subterranean clover—species which can be expected to yield a highly profitable return from really heavy manuring.

Mention should also be made of the useful "implement" used by Mr. Martin (see Fig. 3). This consists of a substantial platform on low wheels with a seed box at one end and a manure distributor box at the other. A substantial amount of seed and manure can be carried on the platform so that sowing can proceed without frequent stopping of the tractor. The seed is

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Fig. 1.—A close-up view of Mr. Martin's property, showing the original scrub-covering. *Fig. 2.*—The giant discs weighted with a box of earth. *Fig. 3.*—Sowing seed and manure. *Fig. 4.*—Photograph taken in early Steptember of pasture sown the previous February.

[*N. Lamont, photos.*

not sown through coulters, and can be covered with light chain harrows.

Costs and Returns

In a job of this kind it is obviously necessary to consider costs and returns at the same time. Some people are inclined to discard a proposition of this kind simply because the improvement costs reach an amount equal to the value of the country in its original state. The significant aspect is, of course, costs in relation to the ultimate productive value of the improved pasture, and it is the latter that is often so difficult to calculate accurately.

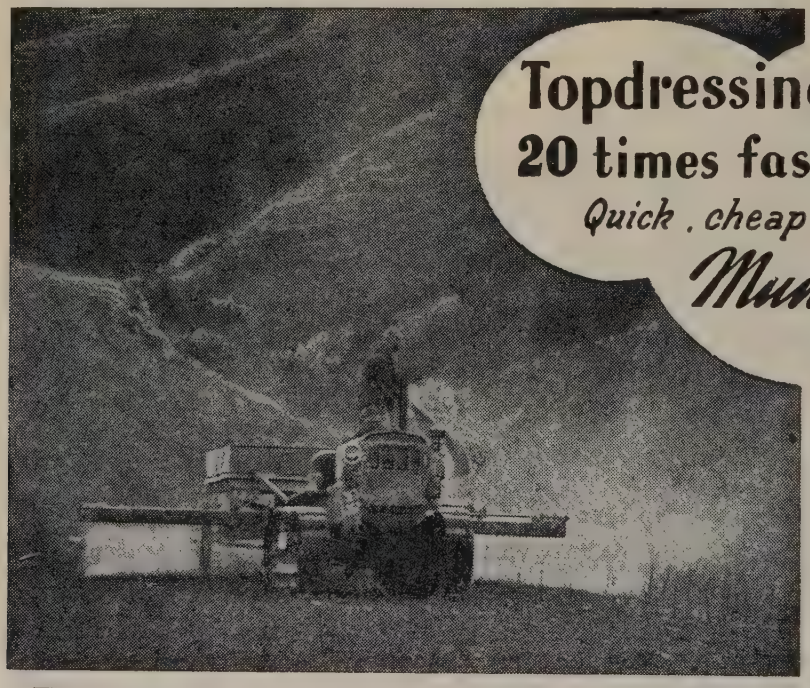
The hill country of the type being considered is generally valued at about £5 per acre, that is, for a reasonable clean sward of native grass. The total cost of sowing down along the lines indicated is also about £5. Accurately-kept tractor costs (including wages and depreciation, and covering two double

discings, one harrowing, sowing lime, and sowing seed with manure) came to a little over £2. The cost of seed and manure can be readily computed.

Unfortunately, no precise figures relative to increased carrying capacity are yet available—nor would their significance be much, as they could apply to only one year—but there is no question whatsoever that the improvement in pasture quality that Mr. Martin, for example, has obtained is far in excess of the 100 per cent. necessary to justify the expenditure.

Even in the photograph (Fig. 4) a reasonable idea of the change can be gained. In the foreground can be recognised the dark green sheen of the dense "rye-sub." sward, with a sharp line of division towards the top of the hill where the pasture is stunted open danthonia and sweet vernal. A point which must be born in mind, too, is that, when considering stunted but fairly dense manuka country, a reasonably good tilth can be obtained

"The development of modern tractors has considerably advanced the 'ploughing front' into country previously considered unworkable."
[*N. Lamont, photo.*



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with the tractor for about 30s per acre, which compares very favourably with the cost of cutting the scrub with the object of securing a relatively less sufficient ash seed bed.

How Permanent?

A question which everyone will ask is: "How permanent will this improvement be?" Time alone will answer this positively, but there is no doubt that much will depend upon the future management; with reasonable topdressing and some form of rotational grazing, one cannot doubt that the improvement is permanent. With no topdressing and with set stocking (involving over-grazing in winter and summer roughage), there can be little doubt that the sward will rapidly degenerate.

Another query that may be raised is in regard to erosion of the cultivated soil on these steep slopes. In theory this might be expected, but in practice, no real evidence of this has been noted by the author. One feels that, while the danger does exist, it is slight.

Even where nearly 12 months fallow is allowed the danger of the top-soil being washed away is rendered negligible by the fact that the soil is generally in a "chunky" state following one discing. But little time need elapse from working up until sowing before the loose seed bed is capable of absorbing even the fairly heavy rains that might be experienced before the developing grass roots bind the soil together.

Summary

(1) The use of powerful track-laying tractors for preparing a cultivated seed bed is a factor commanding attention when considering hill country pasture improvement.

(2) An important feature to be borne in mind is the use of a long fallow period—up to 12 months—to enrich the soil and, by rendering it more friable, reduce the number of operations necessary to produce a seed bed.

(3) The cheapest seed mixture to sow is made up of certified strains.

(4) At least 3 cwt. of superphosphate should be sown with the seed, followed by a further 3 cwt. the following summer.

(5) There is every reason to expect that a pasture composed mainly of ryegrass, dogstail, subterranean, and white clover can be maintained indefinitely even on this country providing adequate topdressing and rotational grazing are practised.

(6) Topdressing must pay for itself on a dense sward of ryegrass and clovers.

Thanks are due to Mr. H. Martin, Otaraia, and Mr. E. Dalziell, Tinui, for providing the opportunity to take photographs, particularly to Mr. Martin and Mr. Busch for the information they made available relative to costs, etc.

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the nine months, May-January, 1940, has been compiled by the Livestock Division:—

District	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Swine
North Island						
Meat-export Slaughterhouses—						
Auckland	108,316	578,072	119,510	58,697	797,204	165,433
Poverty Bay-Hawke's Bay	25,502	60,681	311,450	118,161	977,020	15,980
Taranaki-Manawatu	58,433	227,911	142,899	76,999	946,743	96,336
Wairarapa-Wellington	20,209	18,336	177,786	58,526	641,794	19,568
Totals	212,460	885,000	751,645	312,383	3,362,761	297,317
Abattoirs	89,670	29,733	360,834	189,659	54,992	83,286
North Island Totals	302,130	914,733	1,112,479	502,042	3,417,753	380,603
South Island						
Meat-export Slaughterhouses—						
Nelson-Marlborough	678	9,772	10,588	3,079	71,641	5,818
Canterbury	8,282	41,690	180,914	128,806	895,878	23,089
Otago-Southland	3,952	40,343	68,342	43,770	1,115,045	3,435
Totals	12,912	91,805	259,844	175,655	2,082,564	32,342
Abattoirs	41,824	10,299	206,223	100,208	32,629	21,208
South Island Totals	54,736	102,104	466,067	275,863	2,115,193	53,550
Dominion						
Meat-expt. Slaughterhouses	225,372	976,806	1,011,489	488,038	5,445,325	329,659
Abattoirs	131,494	40,031	567,057	289,867	87,621	104,494
Grand Totals	356,866	1,016,837	1,578,546	777,905	5,532,946	434,153
In addition the following stock were slaughtered for local consumption at rural slaughterhouses during the 9 months ended 31/12/39	57,869	1,511	173,788	Unknown	15,281	21,185
Same Period, 1938-39:						
Meat-export Slaughterhouses and Abattoirs	351,546	980,510	1,625,384	797,736	5,446,079	563,109
Rural Slaughterhouses	64,352	1,606	162,447	—	14,393	21,406
Same Period, 1937-38:						
Meat-export Slaughterhouses and Abattoirs	355,355	1,031,590	1,426,802	719,425	5,696,904	637,788
Rural Slaughterhouses	66,361	1,459	159,577	—	14,746	20,526

Slaughterings of Pigs

Contributed by the LIVESTOCK DIVISION.

The 106,129 pigs killed during January were distributed in weight ranges as follows:

Under 60 lb.	656
61-100 lb.	14,336
101-120 lb.	19,372
121-160 lb.	51,453
161-180 lb.	14,731
Over 180 lb.	4,342
Sundries	1,239

Although the number of pigs killed this month is less, the estimated weight of pig meat is slightly more than for January, 1939 There is a small increase in killings of 60-100 pigs in export slaughterhouse, and a decline in these for local consumption.

The grading of pork is 92 per cent. primes and 8 per cent. second quality, and of bacon 69 per cent., 23 per cent., and 8 per cent., of prime 1's, prime 2's, and second quality respectively.

In the different weight ranges of baconers the grading is as follows:—

101-120 lb. 85, 10, 5% of P1, P2 and 2nd quality respectively.

121-160 lb. 67, 25, 8% of P1, P2 and 2nd quality respectively.

161-180 lb. 47, 40, 13% of P1, P2 and 2nd quality respectively.

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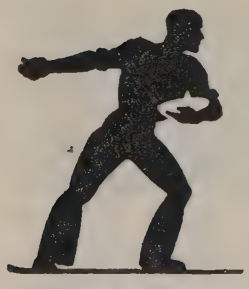

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Selecting A Seeds Mixture

Taking Advantage of Species Most Suited To Local Conditions

(Continued from February issue)

P. S. SYME, Instructor in Agriculture, Warkworth.

WHEN deciding on a mixture, it will generally be found good policy to take full advantage of the most highly-producing species of grasses and clovers which the land is capable of maintaining, having regard to the topdressing practice to be followed and the intended duration of the pasture. It may be well, also, to include a "next best" as a natural successor which will take up the running should the better species fail, and so avoid the risk of bare patches which eventually become colonised by weeds.

In the former connection, it has been contended that on much of the land the fullest advantage conferred by the warm climate in the north can be properly exploited only by the inclusion of paspalum. For this reason also, perennial ryegrass, because of its long-growing season and high production, is universally included as a major component on all soils of higher fertility.

Regarding the inclusion of Italian ryegrass in a permanent pasture mixture, there is, however, much difference of opinion. It is admitted that this does provide a greater bulk of earlier feed, but there is sometimes a risk that it may be detrimental to the sward, and, considering future production, the immediate gain may be dearly bought, particularly if the early management of the pasture does not take the Italian ryegrass into account.

Weaknesses

Mention has already been made of the value of timothy and cocksfoot as producers of late spring and summer feed. Although these grasses are extremely popular and are very generally included in permanent pasture mixtures, investigation has shown that their contribution is frequently disappointing and bears small relationship to their proportions in the mixture sown.

Admittedly, under suitable conditions, these grasses are of considerable value and may very well be worthy of inclusion. It should, however, be remembered that both have certain inherent weaknesses, and it is unwise to rely too greatly on their permanent establishment as major contributors unless experience has shown that they will suit the prevailing conditions.

Factors governing the selection of the most suitable seeds mixture for your farm are further discussed in this article. A wide variety of mixtures may be compounded, depending on local conditions, and five examples for permanent sowings are given.

Timothy thrives well on the heavier soils of high fertility, but it is not worth consideration on the lighter types of soil or where it may be exposed to summer droughts. Cocksfoot is widely adaptable to soil and climate, but is somewhat slow in establishing, and does not well withstand competition from ryegrass under conditions of severe controlled rotational grazing combined with heavy topdressing. It frequently contributes well, however, in fairly large paddocks which are not consistently hard grazed.

Importance of Clovers

As the main factor determining the growth and production of the grass elements is the quantity of nitrogen available, provision must be made to include sufficient clovers in a seeds mixture, and, just as perennial ryegrass takes pride of place among the grasses, so ranks white clover among the legumes.

In addition to its virtues as a sustained high producer, white clover possesses the additional merit that its soil fertility and moisture requirements are almost identical with those

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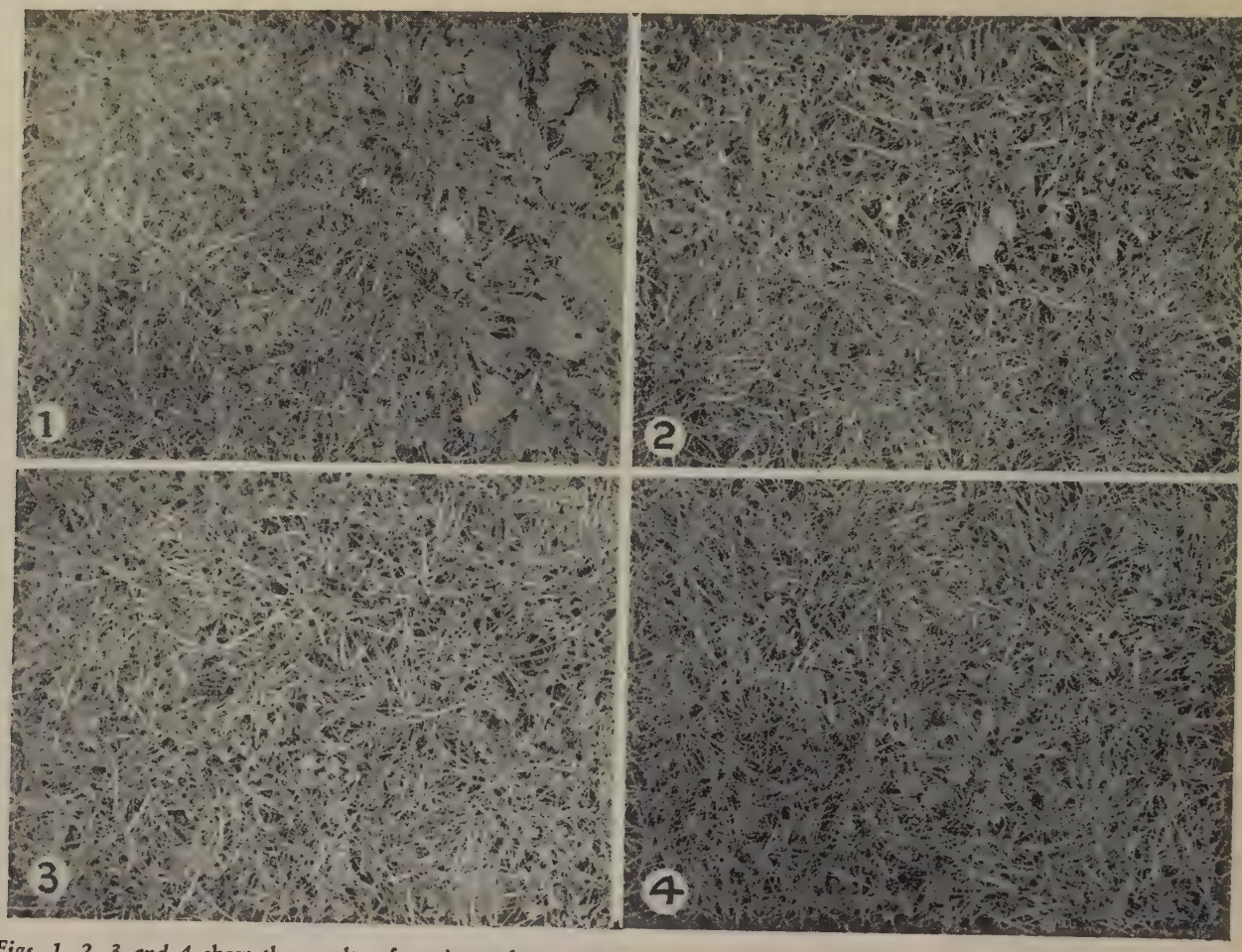


Figs. 1, 2, 3 and 4 show the results of sowings of a mixture at 10, 20, 40 and 60 lb. respectively per acre. The sward in Figs. 1 and 2 is thin and weedy. Fig. 3 shows good plant development combined with effective ground cover. Fig. 4 shows excellent ground cover, but individual plants are rather stunted.

of perennial ryegrass, with which it makes an excellent, easily-managed, and permanent partner. Where conditions favour its growth, white clover is undoubtedly the most valuable legume for permanent or long duration pastures.

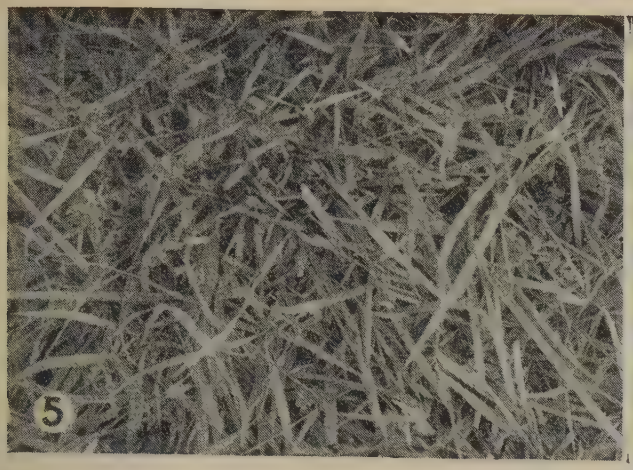
In considering the claims for inclusion which might be made for other clovers, it should be remembered that red clover and alsike are not perennial in character, and tend ultimately to disappear from the sward, so that eventually the work of providing nitrogen will fall on white clover or some other legume. Ordinary broad red clover is comparatively short-lived, but a good strain of Montgomery red clover may, under suitable conditions, last for several years longer. For this reason, broad red clover is the better adapted for short duration sowings, while Montgomery red is to be preferred for long duration pastures.

Alsike demands a richer soil than red clover, and is better adapted for rich, moist land such as drained river flats or reclaimed tidal areas which are still slightly salty. It is less exacting in its lime requirements than red clover, winters better, and is to be preferred for late autumn sowings. It provides feed of better quality than red clover, but does not recover so well after grazing, and on most soils is inferior to red clover as a producer. Because of its cease of establishment it is sometimes included as an insurance against clover failure, and as its erect habit of growth renders it less likely to cause smothering, it may sometimes with advantage replace some or all of the red clover in a permanent pasture mixture.

Sub. Clover

Of recent years considerable attention has been devoted to subterranean clover, and comprehensive field trials are now in progress to determine which of a number of different strains is most suitable for general farming conditions. Subterranean clover is an annual, but because of its very efficient method of planting its seeds, it quickly becomes permanently established where conditions are suitable.

It should be included only in autumn-sown mixtures, and it should be remembered that, where sown on good dairying land, its excessive growth may give rise to serious trouble from bloat in the spring. It does, however, provide much valuable early feed, and may very usefully be employed where white clover does not really thrive or will not establish. Of recent years, subterranean clover is becoming increasingly popular for fat lamb pastures.



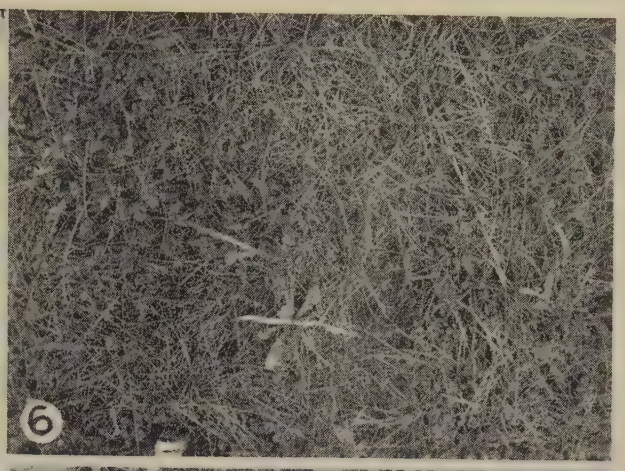


Fig. 5.—When sown at small rates in normal spring or autumn mixtures, paspalum may take six or seven years to establish. The paspalum in the photograph was sown alone in November at 15 lb. per acre. The picture was taken before sowing the balance of the mixture in the following February.

Figs. 6 and 7.—Subterranean clover dies after seeding, but re-establishes very rapidly in late summer. The two photographs of exactly the same area were taken on February 10 and February 17, 1938, and illustrate the remarkably rapid development after rain.

Simple v. Complex Mixtures

From the time when pastures were first produced by the sowing of seeds mixtures down to the present day, there has been much difference of opinion on the problem of simple versus complex mixtures, and in spite of the fuller knowledge now available this controversy still continues. It is held by some authorities that the "shot-gun" type of mixture defeats its object, as competition is made excessively severe to the detriment of production, and, in the long run, the ultimate sward is composed of a few surviving species only.

Moreover, as the surviving species could readily have been predicted from a knowledge of existing conditions, much waste would have been avoided had these alone been sown. This argument is probably true where pastures are being sown for short duration. Again, where natural conditions and a system of severe rotational grazing combine to favour ryegrass and white clover, resulting in a tendency for them to form almost a pure association, it may be possible to justify a simple mixture of these two species.

Under more general conditions, however, the simple mixture has certain obvious weaknesses. Seasonal production is not well balanced. Should fertility fall, or should either species fail, weeds readily take possession and the sward deteriorates very quickly. The sward formed by the simple mixture is not renowned for palatability, and if grazing stock had the gift of speech they would certainly return a very adverse verdict. In this connection, most farmers will readily agree that, for steady grazing, stock invariably prefer a good mixed sward to that composed of any one species, no matter how succulent and palatable this may be.

Quantity per Acre

The quantity of seed which should be sown depends on a number of factors, such as the quality of the seed bed, the fertility of the soil, the percentage of germination of the seed, and the size of the seeds, etc. Experience with field trials commonly shows that, with the normal type of mixture, about 40 lb. per acre may be expected to give the best results on a well-prepared seed bed in a favourable season.

When the quantity is increased to 60 lb. competition is apt to be very severe and individual plants may be unable to develop to full advantage. If the sowing is reduced to 20 lb. even under favourable conditions the sward is likely to be weedy and patchy. The heavier seeding might well prove superior, however, in an adverse season or on a poor seed bed.

Considering that conditions may unduly favour the quick establishment of certain species while retarding that of others, the mixture must to some extent be based on empirical figures, which are largely the result of common experience, rather than based on purely theoretical considerations. Due prominence, however, should always be given to those species intended to form

the mainstay of the sward, keeping constantly in view such important factors as soil fertility, moisture content, and the system of management to be adopted.

Index to Mixtures

The following figures represent the sowings per acre of each species which is considered necessary to provide a full ground cover under normal conditions, and with due allowance for the average germination of each species. Although such pure sowings are, of course, not practised, the quantities provide a useful index when compounding an actual mixture:—

Approximate Quantities Required for Pure Sowings of Different Species.

	lb.		lb.
Perennial ryegrass	30	Prairie grass	40
Italian ryegrass	30	Paspalum	54
Cocksfoot	16	R.S. Meadow grass	8
Dogstail	10	Red clover	20
Timothy	8	White clover	10
Meadow foxtail	17	Alsike	12
Danthonia	18		

It will be noted that under New Zealand conditions the quantities commonly sown in mixtures vary somewhat from the amounts which would be prescribed if based proportionately on pure sowings. It may be pointed out, however, that in Britain it is a common practice to estimate the respective percentage of each species as required in the sward, and simply to take a corresponding percentage of what would be a pure sowing, adding to each, if necessary, sufficient to compensate for any temporary elements likely to die out.

Generally speaking, minor variations in a mixture are of little importance, as their influence on the ultimate sward tends to be overwhelmed by the preponderant effect of management. Basic variations, particularly those relating to the introduction of additional species, may, however, exercise a very important and far-reaching effect if the species concerned happen to suit existing conditions. For this reason, the type of general prescription often recommended may sometimes miss the mark, and the most satisfactory results are to be expected when the mixture is compounded specially to suit existing conditions.

Examples

The following examples of seeds mixtures may be very simply modified. as required, to suit any peculiar local conditions. The actual quantities which should be used will depend to some extent on the quality of the seed bed. It should be noted that good consolidation favours the establishment of white clover.

Temporary Sowing.

25 lb. Italian ryegrass.
5 lb. broad red clover.

Permanent Sowings.

(1) A simple basic mixture for good land under hard rotational grazing—

Cert. per. rye	25-30 lb.
Cert. white clover	3-5 lb.

If red clover is required the mixture may be amended to—

Per. ryegrass	25-30 lb.
Cert. white clover	2-3 lb.
Red clover	2-3 lb.

Where quick feed is an important consideration, about 5 lb. of Italian ryegrass may be substitued for a corresponding quantity of perennial rye. Too much Italian rye should not be used.

(2) Where subdivisions are larger and grazing less intensive, some of the ryegrass may be replaced by cocksfoot and dogstail, somewhat as follows:—

Per. ryegrass	20-25 lb.
Cocksfoot	8-10 lb.
Dogstail	2 lb.
White clover	2-3 lb.
Red clover	2-3 lb.

Cocksfoot establishes rather slowly, and particularly so if fairly hard grazed. To be effective, a fair sowing is required.

(3) Where the soil is naturally rich and moist, a somewhat specialised type of mixture, which includes foxtail, timothy, *Poa trivialis*, and alsike may be sown to advantage. The Italian rye, alsike, and red clover will eventually die out, but on such soil the other species may persist indefinitely. Foxtail is very useful in providing early feed, while timothy is a useful summer producer.

Cert. per. rye	20 lb.
Italian rye	5 lb.
Timothy	4 lb.
Foxtail	4 lb.
Poa trivialis	2 lb.
Red clover	2 lb.
Alsike	2 lb.
Cert. white clover	2 lb.

(4) The following mixture is well adapted for gumland soils:—

Per. rye	25 lb.
Cocksfoot	4 lb.
Paspalum	8 lb.
Dogstail	2 lb.
Broad red clover	3 lb.
Lotus major	1 lb.
White clover	2 lb.

Subterranean clover frequently succeeds better than white clover on exposed faces, and some may be included where conditions are hard.

Where speedy establishment of paspalum is desired, this may be sown alone at about 15 lb. per acre on a well-prepared seed bed in November when the soil is warm. The balance of the mixture is then sown and harrowed in during late February or early March. The objection to this method is that the paspalum is apt to be established at the expense of the ryegrass and clover, and much depends on the weather after the paspalum has been sown.

(5) Mixture for peaty soil (unconsolidated):—

Per. ryegrass	15 lb.
White clover	1 lb.
Paspalum	12 lb.
Lotus major	3 lb.
Yorkshire fog	6 lb.

No Cause For Blame

The variety of prescriptions which can be compounded, like the range of actual local conditions, is indeed endless, and those given are merely intended to indicate something of the scope available. Needless to say, only the best of seeds should be sown, and, wherever possible, certified seed should be given preference. The wise farmer will also buy his seeds separately and mix them for himself. By consistently following this practice he will seldom have cause to blame anyone for bad results—not even himself.

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Give The Pigs A Wee Drop Of—Barley

By Utilising the Cheap Supplies of Barley You Will Be Returning Money To Your Own Pocket

M. McG. COOPER, late Secretary of the National Council of Primary Production.

IF you go out early on a miserable morning in winter and find that a sow has farrowed and some of the young pigs are chilled and near to death through crawling away from the comfort of their mother's milk, it is a good idea to give them a hot bath and a rub down. This will restore circulation, and, if they are kept warm and given a little warm milk, the chances are that they will live to make bigger and better bacon.

To make doubly certain, you might give the little fellows a nip of whisky, broken down with the milk. More generally, if the morning is particularly cold and blustering, you may deem it wiser to take the whisky yourself, without the milk, and let the pig smell the cork.

Barley As Pig Feed

Talking of whisky naturally leads one to barley, which is the basis of all reputable "Scotch." Barley is also an excellent food for pigs, although probably you would have the greatest difficulty in persuading a day-old pig to take it. But not so later on in the pig's life. After weaning, barley along with the skim-milk, or with a bit of meat-meal if you are feeding whey, constitutes one of the finest fattening foods for pigs. It is cheaper today than it has been for 30 years, and that is more than can be said of whisky.

You can buy best Australian feed barley for 3s 4d per bushel ex ship at the main North Island ports. This is for minimum lots of ten bags, and you order it in the ordinary way through your merchant. At this price it represents very good buying, and, with prices for pig-meat as they are, the use of barley for pig-feeding is a sound farming proposition.

It is pleasing to prohibitionists, for it means less barley will go into distillation, and the pig enjoys the inherent virtues of the barley germ without the soul-destroying influence of John Barleycorn. Those who vote "continuance" can soak the barley in water for two or three days until it has a nice beery smell, which should be easily recognised. Fed at this stage, barley is easily digestible, and does away with the expense of grinding or cooking. The amount of alcohol formed is infinitesimal in actual fact, so all consciences can be clear if soaking of barley is generally adopted.

Here is a provocative article on the utilisation of the available supplies of cheap barley for pig feed.

Wholesale Prices

Many people will object to buying barley in a minimum of a ten-sack lot, but they can't enjoy wholesale prices unless they buy in wholesale quantities. You cannot expect merchants to peddle a sugar bag of barley and receive virtually nothing for their efforts.

In any case, you can't tell whether a ten-sack lot is going to be too much until you decide the quantities you are going to feed your pigs. This the farmer must determine for himself, because the economics of feeding grain to pigs is entirely governed by the way they are being managed. If they sleep in a wind-swept, draughty stye and take their exercise and meals with their bellies resting on mud it may not pay to feed barley at a shilling a bushel, but if they are kept as pigs ought to be kept, then you can, with confidence, feed as much as 2lb. to 3lb. of barley per pig per day according to age and the milk available.

This quantity may be increased, because as the season ends and the cows are drying off, it is obviously better to finish pigs near slaughter weight with a diet almost wholly of barley rather than to keep them hungry throughout the winter. It is all a matter of judgment, and the individual farmer is the sole judge.

Service to Industry

If you are fattening 20 pigs, then you will be feeding a bushel a day, and a ten-sack order will be finished in

CONVENIENT AUCKLAND

80 ACRES.—All flat to easy undulating land, good soil, and property is well fenced. About 5 acres shelter bush, balance grass. Six-roomed house, elec. lights, bathroom, washhouse, etc.; 8-bail cowshed, manure shed, etc. Situated only about 1 mile from township, school and station. Telephone, etc. PRICE : £42/10/- PER ACRE, INCLUDING 50 cows, 4-cow milking plant, separator, electric motors, etc. About £1400 cash satisfactory. This is a splendid property lying well to the North.

CONVENIENT TO EAST COAST.

400 ACRES. All good quality land, 350 acres grass, balance bush. No buildings. Would carry about 50 cattle and 300-400 sheep. Metal road, school opposite. About 1 hour's drive from the city. PRICE ONLY £2/15/- PER ACRE.

HANDY TO WHANGAREI.

168 ACRES. About 100 acres good grass; 9 paddocks. About 20 acres bush. Will carry 50 cows and about 150 sheep besides young stock. Choice home of 10 rooms, garage, fairly rough cowshed. Situated 1½ miles from school, tar sealed road. Telephone. PRICE : £2700. £450 cash, balance Government mortgage.

600 ACRES. This is a good sheep or mixed farm. Some beautiful flat land, balance undulating with some easy hills. Good black loam soil, well watered, 10 paddocks. Practically all grass, balance beautiful bush. Carrying 20 cows, 2 bulls, steers, about 60 run cows, 60 calves, 220 ewes, 120 hoggets, 5 rams, 160 lambs. Six-roomed house, washhouse, garage, wool shed with shearing plant, cowshed, etc. Situated about 1½ miles from school and station. PRICE : £3600 and £430 DEPOSIT SATISFACTORY. This property is beautifully situated and with a bit of work could be made into a splendid mixed farm.

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under six weeks. If you haven't got that many pigs or if you are unable to run to an order involving no more than £8 for the average farmer, then you might come to an arrangement with a neighbour to take part of the order. Get him into the habit of feeding barley as well and you will be doing a good service to the industry.

A bushel of barley a day to 20 pigs will sound like a lot of barley to many farmers who think they are giving up some of their life blood when they put a handful of grain in the pig trough. It may be, on New Zealand standards, but then most of our farmers have a Moslem-like regard for the pig and treat the poor animal accordingly.

But past attitudes and habits are not important. What is important is that, from the evidence of surveys of pig production made by the Department of Agriculture, the farmers who feed grain or meals up to 25 per cent. of the ration make the most money out of pigs! And this is computed with meals at £14 a ton! If you have separated milk and you can land barley on your farm for £8 per ton then it is money for old boots. You will be able to feed as much as 1lb. of barley to a gallon of milk and still obtain an increasing return from your separated milk.

Help the Empire

This country is at war, and Great Britain is having to ration her bacon supplies! The dairy farmers of New Zealand can, without question, double their pig production with not only profit to themselves but the knowledge that they are making a real contribution to the Empire's war effort. No matter by what shade of the rainbow your political views may be coloured, no matter how low is your regard for pigs, keep them and feed them, because there are forty-five million people on the other side of the world who dearly love the eggs and bacon that are being denied them.

It is your duty to feed pigs, and it will be your pleasure, too, if you feed and house them properly. Who will deny you the boon of a drop of whisky on a cold winter's morning, or night for that matter, if you are doing your duty by your pigs and by your country? Just order the barley in the ordinary way from your merchant, but buy it ex ship in ten-sack lots. When you get it home don't hoard it, don't let the rats eat it, and don't let your wife feed it to the fowls. Turn it into pig flesh and market it again as soon as possible.

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"Bucking Horse" Brand . . SHEEP

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*GIESENS — Tetrachlorethylene. For intestinal and Blood-sucking Worms. One gallon doses 900 lambs, 450 sheep. 22/6 gal., 13/- ½-gal.

*KARTET — Carbon Tetrachloride. For Blood-sucking and Intestinal Worms, and Liver Fluke. One gallon doses 900 sheep, 1,800 lambs. 30/- gal., 16/- ½-gal.

*SUTTON'S — Nicotine Bluestone. As recommended by the Dept. of Agriculture. For Hair Worms, Stomach Worms and Tape Worms. 16oz. bottle, 8/-—Doser free.

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Boiling Water in Supplying Dairies

Influence of Electricity On Cleanliness

Contributed by the DAIRY DIVISION.

BEFORE the milking machines came into general use on the dairy-farms of the Dominion the provision of boiling water for cleansing purposes was not a serious problem. Herds were comparatively small, the small amount of plant in use was of a very simple type, and fuel was more plentiful than it is today. A bricked-in washing copper gave the service required in larger dairies, and in the smaller ones the supply was obtained from the farm-house kitchen.

In the early stages of mechanical milking manufacturers were more concerned with perfecting the machine than with the cleaning of the plant, a feature which was further complicated with the invention of the milk releaser. Water heating by the use of the heat developed by the exhaust of the engine which drove the plant was given much attention, but this proved to be totally inadequate, and until the development of the hydro-electric services, which now cover most of the dairying districts of the Dominion, the washing copper was practically the only means available for boiling water.

With the adoption of the releaser came the necessity for the provision of tinned brass piping to facilitate cleaning and for boiling water with which to carry out the work. The general regulations under the Dairy Industry Act, 1908, made in 1926, covered both of these points.

The various methods of heating water for the cleaning of dairy shed equipment have been investigated by the Dairy Division through a questionnaire which was sent to all dairy farm instructors. The replies show the influence of electricity on dairy shed cleanliness, and where power boards have been able to meet the requirements of the dairy farmer, electric heaters have raised the hygienic standard of supplying dairies.

Worth of Power Boards

The power boards in the dairying areas deserve credit for the steps taken to bring water heating facilities into line with the requirements of the dairy farmer. The flat rate system of charging for the current required to provide boiling water, based practically on the size of the herd milked, had a far-reaching influence.

The first water heaters installed were lacking in efficiency in some respects. In some instances there was insufficient lagging on the cylinders, and in others the draw-off taps were so small that the water lost a considerable amount of heat before the bucket in use was full. These and other defects have now been remedied, and generally it can be claimed that in most power board areas an efficient service is available to dairy farmers.

For some years before 1938 much work was carried out by officers of the Department of Agriculture and of the power boards to determine the type and size of heater which would serve the requirements of dairy herds of different sizes, the size of element required, and so on. As a result a schedule was included in the Dairy-produce Regulations, 1938, which covered the requirements of dairies supplying either cream or milk to dairy factories.

Difficulties Faced

The difficulty which arises in compiling such a schedule is firstly the fact that a definite amount of heat is given off by an electric element in a certain time. This cannot be temporarily increased as in the case of a fuel heater. Secondly, the conditions on a dairy farm are variable. The product of a herd may be separated on the farm, or it may be delivered to a factory receiving milk.

In the first instance the amount of boiling water required will be practically the same at both morning and evening milkings. In the second, there will be a number of large milk cans to be washed and scalded in the morning, but none at night, and consequently more water will be required in the morning unless the factory supplied happens to have facilities for washing cans. Hence the necessity for Tables A and B in the schedule.

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For quicker, easier milking
Thousands of Dairyfarmers throughout the Dominion are praising MILKEEZE—the ideal preparation for sore, wounded teats, and cracked, swollen udders.
MILKEEZE keeps teats soft and supple. Positively does not taint the milk. *From all Chemists and Stores.*
1-lb. tins, 2/3; 4-lb. billies, 6/6; 36-lb. tins, 1/4 lb.

The period between milkings is frequently shorter during the day than during the night, and the heating time is therefore irregular. In addition, there are other factors such as variation in the interval between milkings from day to day and at different seasons of the year, the number of cows in milk, variation in atmospheric conditions, and so on.

Basis of Efficiency

The efficiency of an electric heater depends, therefore, largely on the intelligence of the user, and as the quantity of boiling water which it will deliver in a given time is limited to the capacity of the element, the quantity put into the cylinder must be varied to suit the heating time available. As this may not be sufficient to do the work required, the capacity of the cylinder must be such that a quantity of boiling water from the longer heating period can be left in it as a carry-over to the shorter period following. A fuel heater under these conditions could be refilled and boiled a second time.

To ensure that the water is actually boiling, the practice with both electric and some fuel heaters is to fill the water container to capacity and refill only after this quantity has been boiled and used. In some fuel heaters boiling water cannot be drawn off unless cold water is run into the container to displace it. This means that only a very limited quantity of the water, which is actually boiling, is available. Electric heaters, on the other hand, have a "draw-off" capacity which is a few gallons less than their full capacity in order to ensure that the element is always covered.

Questionnaire

On July 31, 1939, the end of the first complete year of the farm dairy instruction service on a Dominion basis and also twelve months following the making of the regulation setting out the requirements for electric heaters for supplying dairies was concluded, it was considered that the time was opportune to gather some information regarding water heating generally.

A questionnaire covering electric and fuel heaters and washing coppers was sent to 91 farm dairy instructors and other officers in touch with this work. The questions were divided up into five sections as follows:—

(1) Electric Water Heaters

State any criticism you may have to make regarding:—

(a) The capacity of the cylinders for the sheds specified.

(b) The size of the elements for the cylinders specified.

(c) Is the schedule being observed by the power boards in your district? State any exceptions.

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(d) What method of charging for current is followed by the boards in your district?

(e) What is the approximate cost per year for current for herds of the following sizes:—2-cow plant, 4-cow plant, 6-cow plant, 8-cow plant?

(2) Electric Steam Generators

(a) What types are in use in your district?

(b) Speaking generally, are they satisfactory?

(c) Which make do you consider to be the most satisfactory?

(d) What is the cost per year for current for sheds of the following sizes:—2-cow plant, 4-cow plant, 6-cow plant, 8-cow plant?

(e) How do they compare with electric water heaters for efficiency?

(3) Fuel Heated Low Pressure Steam Generators

(a) What types are in use in your district?

(b) Speaking generally, are they satisfactory?

(c) Which make do you consider to be the most satisfactory?

(d) What is their approximate cost for fuel per year for sheds of the following sizes:—2-cow plant, 4-cow plant, 6-cow plant, 8-cow plant?

(e) How do they compare for efficiency with: (a) Electric water heaters; (b) electric steam producers?

(4) Washing Coppers

Are they satisfactory?

(5) Which, or what combination of the foregoing do you consider to be most satisfactory? Give reasons for your opinion.

In dealing with the answers to questions (1) and (2) only those from officers in districts where electric current is available in the North Island were included. These showed definitely that the sizes adopted in the schedule were proving very satisfactory, and that the power boards had in most cases carried out the requirements of the regulation, and in some cases had even gone further than required. Replies to questions were as follows:—

Size of Cylinders

Question (1). Electric Water Heaters

(a) *Size of Cylinders.*

Forty-six gave unqualified approval of the sizes specified in the schedule. Nine suggested that the sizes specified in Table B, milk supply dairies, were on the small size for large herds, or that Table B as a whole could be larger with advantage. Five considered that the larger cylinders included in the schedule were too big, and that the capacities provided in Table A, cream supply dairies, were sufficient for Table B.

All of the 14 officers included in the two last statements had experience of the requirements of milk supply dairies. Some of the 46 referred to cream supply dairies only.

Some of the above criticisms arise from the necessity for limiting the number of different sizes of cylinders specified, which was asked for by the representative of the power boards.

(b) *Sizes of Elements.*

Forty replies gave unqualified approval of the elements scheduled. Five considered them to be too small. Eight regarded them as being large enough if continuous current were provided in all cases. Two thought they were too large, and three suggested variations for improvement.

Experience has shown that there are a number of factors influencing the efficiency of the heating element, and consequently the opinions expressed. Some of these are as follows:—(1) An element near a transformer will give better service than the same element at the end of the same line. (2) This will be influenced by the load on the line. (3) A mineral deposit on the

AFTER MILKING
COMES THE WASH-UP
STARKIE
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ELECTRIC
DAIRY HEATER
Supplied complete with element, insulation, outer casing, tap and filler, in all sizes. Delivered free to any North Island Port or Railway Station. See your Power Authority or get particulars from us.
BOILING water for the milking shed is supplied at lowest cost and with no bother by this Starkie Electric Dairy Heater. Easily filled by bucket or tap. Has full-bore inch draw-off cock so that the boiling water pours rapidly without losing temperature. Strong handle withstands knocks. Heating element always covered and cannot burn out. Put this time saver and labour saver on duty on YOUR farm!
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"STARKIE" FOR HOT WATER

element will reduce its efficiency, and for this reason some power boards provide a regular service for cleaning them. (4) The intelligence of the user. This point has already been mentioned, but in addition there is the common practice of using water from the heater for purposes other than the cleaning of the dairy plant. This is not provided for in the schedule of quantities.

Suggestions

The capacity of the cylinders shown in the schedule are the full holding capacity. The amount of water which can be drawn off is a few gallons less as sufficient water must be left in the cylinder to cover the element. If the cylinder is not refilled, and this water should boil away the element will be damaged. One suggestion made was that the draw-off capacity should be shown on the cylinder. A second, that if the capacity of the cylinder is increased by five gallons without increasing the draw-off capacity the boiling water remaining will act as a reserve, and the heating efficiency will be increased. It is claimed that under these conditions a cyclinder with a total capacity of 20 gallons and a draw-off of 12 gallons will boil in less time than will a 15-gallon cylinder with the same draw-off and the same size of element.

These two suggestions appear to be worth further consideration.

(c) *Is the schedule being observed by power boards?*

North Island replies only were included, and all of them, sixty in number, stated that since the making of the regulation the power boards had complied with its requirements in all new installations.

One or two boards in the South Island are also giving good service, and it is perhaps correct to say that most boards are prepared to supply current for dairy farms under conditions which will comply with the requirements of the Dairy Produce Regulations at a price.

In some areas current is available at night only. In others at night, plus an additional short period during the day, perhaps one hour. Such a service does not comply with Regulation 4, which defines a non-continuous supply of current as one which is disconnected during milking hours only.

Switch Control

Those on a change-over switch are in line with requirements as the starting of the milking motor automatically cuts off the current from the water heater while the stopping of the motor switches it on again.

But where a time switch is used, the current is usually cut out at peak load periods, which may not coincide with milking periods and may give several hours less service than the change-over system. To meet this position, some boards have increased the capacity of both the cylinders and the elements provided. The time switch system of control or payment at per unit is fairly general in the South Island, and the number of electric water heaters on dairy farms is comparatively small. Consequently, the opinions expressed regarding their efficiency are not of much value. The unit system of charging for current is not satisfactory from the point of view of quality as will be shown later.

(d) *Method of charging for current.*

Fifty-three of the 61 replies received from the North Island stated that the charges for current were based on a flat rate of so much per 100 element watts per annum. These rates vary from 14s to 25s per 100 watts, depending on the district, and whether the service is non-continuous or continuous. The lowest charges are in areas where intensive dairying is carried on, and power boards have consequently been able to provide a cheap service. Charges vary considerably, even in adjoining districts, and are dependent on such conditions as the use of an electric motor to drive the milking plant, or a domestic range on the same farm.

Non-continuous current with provision for the use of about 100 watts during milking is provided in some areas, the charge being either included in the flat rate at per unit or at per year. All reports regarding this additional service speak of it with approval, and it would probably be correct to say that where the non-continuous service elements are criticised as being too small, the use of this supplementary element would meet the position, though the arrangement does not make it a continuous service.

Flat Rate Charges

"Flat rate" seems to have a different meaning in the South Island, where in most instances it is a minimum charge, and current in excess of the minimum is charged for at per unit. The evidence in the reports is to the effect that under this system there is a definite inclination to use as little boiling water as possible with a view to keeping down the cost. The result is that the dairy equipment is in an unsatisfactory condition.

All the evidence shows that a charge for current on a flat rate sufficient to allow for the provision of boiling water twice daily without effort by the user is the most satisfactory means of heating water in a supplying dairy.

(e) *Cost per year.*

The total cost of current for the year varies considerably even between districts catering for intensive dairying areas as shown by the following schedules:

	Non-Continuous.	Continuous.
Up to 750 W. ..	£4 p.a.	£ 9/10/- p.a.
Up to 1,000 W. ..	£5 p.a.	£11/10/- p.a.

Non-continuous only.

600 W.	£5/8/-	p.a.
750 W.	£6/15/-	p.a.
1,000 W.	£9	p.a.

Question (2). Electric Steam Generators and Water Heaters.

The use of electric steam generators is practically confined to the South Auckland area, as only four officers mention them in other districts. Three makes are included in the 20 replies received. Sixteen regard them as satisfactory, two consider that they are unsatisfactory, and three state that only the water-heating section is used. Only three give any preference for any particular make, no doubt because of their limited experience of other makes.

The cost for current is about the same as for electric water heaters in some areas, but the higher cost in

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other districts was given as an objection to their use.

Six regard them as being more efficient than electric water heaters, seven consider them to be equal, three not as good, and one expresses no opinion. It would appear from the location of the officers reporting that these units have received sympathetic treatment by power boards in some areas, while in others they have not been well serviced.

Not a Cleanser

Two point out the danger of the use of steam in dairy work in the hands of some farmers, who are inclined to regard it as a cleanser instead of a means of sterilising equipment which has already been thoroughly washed.

Question (3). Low Pressure Fuel Heated Steam Generators.

(*a*) *Types in use.*

Of 91 replies received, 85 include heaters of this type, all of which also heat water for cleaning purposes. Twenty-three makes are named, and these can be roughly classed as those of the boiler-plate type, which are heated with coal or wood, and those made of copper, which are heated with either of these fuels but principally with fuel oil. High-pressure boilers were not included, although a number are in use in all dairying districts.

There is a very distinct difference between low-pressure and high-pressure steam generators. The former are usually filled by hand, some of them requiring that cold water shall be run in to displace the boiling water for use. These give a very small supply of water which is actually boiling. On the other hand, the water must boil before the low-pressure steam used for sterilising the dairy equipment is generated. They do not require a certificate of inspection.

When a high-pressure boiler is used water is usually heated by blowing steam into it, and this water will seldom exceed 195 degrees Fahrenheit in temperature. That is not a serious drawback if the steam is used to sterilise the dairy equipment after it has been thoroughly washed. They require a certificate of inspection.

(*b*) *Are they satisfactory?*

Forty-two regarded these generators as being satisfactory, nine considered them to be unsatisfactory, and 32 gave them a qualified approval, a total of 83 replies from both Islands.

Limiting Factors

The satisfactory points were that the amount of boiling water available is limited only by the supply of fuel and the will to use it. That water can be heated at any time during the day which makes it possible for an instructor to see that any milking plant which is unclean is washed before he leaves the farm.

The 32 who gave qualified approval, and the nine who condemned them can probably be included in the same category, as the same reasons were given in both cases. The same reasons are probably an unstated qualification in the 42 approvals, as they were:—(1) Dependence on the human element; (2) neglect to maintain a supply of fuel; (3) neglect to use them at night, in wet weather when the wood is wet, or through a desire to save fuel; (4) the water is used before it is boiling; (5) equipment is frequently rinsed with cold water and reliance placed on steam to clean it.

A number of officers have a definite objection to the use of steam for sterilising purposes on dairy farms in the present state of knowledge among farmers, and consider that this point has been stressed by salesmen to the exclusion of the necessity for first cleaning the plant, the result being the formation of milkstone in the milk pipes.

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Others state definitely that low-pressure steam destroys milk rubbers by softening them, while high-pressure steam has a vulcanising effect and prolongs their life.

(c) *Which is the best make?*

This question really resolved itself into a choice between oil-burning heaters and those burning coal or wood, and, as could be expected, the former were preferred where fuel is difficult to obtain, and the latter where it is plentiful and cheap. Another point in favour of oil is the reduced difficulty in keeping up a supply, but it was mentioned that even where oil fuel is used the heaters are frequently not lighted at night.

Contamination Danger

The danger of contamination of milk and cream by oil fumes was mentioned in connection with oil-burning heaters in a number of the replies, as an undesirable feature in a dairy water heater, and one which is accentuated when spent crankcase oil is used.

Taking all points into consideration, the preferences between oil fuel heaters and those using solid fuel were about equal, though there were definite preferences expressed for certain makes of both.

(d) *Cost per year.*

This question did not result in many replies being received, as few farmers keep reliable records of such items. Even where oil fuel is used some wood from the farm is usually available, and be used in conjunction with it. The following figures give evidence of careful preparation and are probably correct:—

	Wood and Oil.	Oil.	Coal.	
2-cow plant—				
	£1/15/-	£2/10/-	£4	per year
6-cow plant—				
	£4	£5	£7/10/-	per year

(e) *How do they compare with (a) electric water heaters? (b) Electric steam generators?*

As there are so few electric steam generators in use in the Dominion, the replies to this question have been dealt with as referring to electric heating generally. The electric steam generator, like the fuel steam generator, usually has a water heating section also.

Electricity v. Fuel

Of 57 definite opinions expressed from the North Island only, eight considered fuel heaters to be superior to electric heaters, 23 gave a qualified preference for fuel heaters, 25 preferred electric heaters, and one regarded them as being equal.

Of the first group only one gave a reason for his preference, namely, that "the quantity of boiling water is unlimited." Qualifications mentioned by group two were: (1) The unreliability of the human element; (2) if they are used; (3) if properly used; (4) if used twice daily; (5) if sufficient fuel is provided; (6) if the fuel is kept dry. Reasons given by the third group were: (1) Elimination of the human element; (2) less trouble; (3) more efficient; (4) more dependable; (5) always ready; (6) cold water is not run into the cylinder in order to get the hot water out.

The preference for electric heaters was very definite in those areas where the power boards have catered for them. Most of the replies which favoured fuel heaters came from the districts where a poor electric service is available or has been in the past, or where fuel is plentiful and consequently cheap.

This also applies in the South Island, where power boards have either not been in a position to supply a good service or have not so far attempted to do so.

Question (4). Washing Coppers

Are They Satisfactory?

The whole of the 91 replies received included references to washing coppers, an indication of their widespread use in the industry. Nineteen said yes, eight said no, 62 gave a qualified approval, and two were indefinite.

It would probably be correct to assume that the 18 who said "yes" did so with a mental reservation that the copper must be bricked in properly or be of the pumice, concrete frame type, that it should be placed under cover, be of sufficient capacity, that ample fuels should be provided and kept dry, that the water should be actually boiled and used twice daily, which are some of the qualifications mentioned by the next group of 62. Those who said "no" probably had experience of neglect of some of these points.

For Small Dairies

For a small dairy a copper has many advantages. It is not expensive to install, the modern frame ensures economy of fuel, the quantity of water produced can be increased at little expense, and dairy utensils can be actually dipped into the boiling water.

For the large dairy a copper is generally found to be inadequate, although a number of replies stated that, as a supplementary means of boiling water in conjunction with an electric heater, it has many advantages.

Like all fuel-heated appliances it has the disadvantage that its efficiency depends on human nature.

Question (5).

Which or what combination of the foregoing do you consider to be the most satisfactory, and why?

Fifty-seven replies were received from the North Island in answer to this question, 37 of which favoured electric water heaters, five preferred electric steam generators, seven fuel-heated low-pressure steam generators, one the washing copper, and seven chose an electric water heater with a copper in addition, especially for large dairies and where milk is being supplied to a factory.

Conclusions

Observations made under the heading of general remarks have been taken into account when dealing with the question to which they were related. The last set of figures indicates very clearly that the electric heating of water for cleaning purposes in supplying dairies is proving very satisfactory in those areas where the service is efficient. The remarks show that, while there is room for some minor adjustments in the schedule to meet certain circumstances, its inclusion in the regulations has brought about a very big improvement in the condition of dairy equipment on the farms.

While it is true that it is more costly than the fuel heater and not so flexible, it is safe to say that without it the same standard of cleanliness in the milking machines of the Dominion would not have been reached. Even with the best intentions there will be times on a dairy farm when the fuel heater will be neglected so long as human nature remains what it is.

A supply of boiling water at each milking, which has to be paid for whether it is used or not when the charge is on a flat rate must surely induce even the least interested dairy farmer to keep his equipment clean, and there is little doubt that this system of charging for current has had a very far-reaching influence on dairy plant hygiene in those districts where it is in use.

Where electric current is not available the fuel steam generator and water heater will serve the same purpose, and in the right hands will do equally good work.

Autumn Topdressing in the Kaitaia District

What Topdressing To Apply

— By —

A. M. LEE, Fields Instructor,

Kaitaia.

"Manures should always be applied when the root systems of the plants are active and when they are not restricted. Do not, therefore, apply manures very early in the spring or when pastures are being grazed to excess. The early autumn is an admirable time to apply manures."

Spreading a dressing of lime at 1 ton per acre with a tractor and distributor.

MOST farmers will now be asking themselves: "What topdressing shall I use this year, and when should I apply it?" and "How much lime will I be able to apply this year?"

The difference between profit and loss and good, fair, or poor pastures is largely determined by the correct utilisation of plant food spread on the pasture in the form of artificial fertilisers and lime. A brief discussion of the soils of the Kaitaia district will show why topdressing is necessary to grass and clover growth. The soil types may be conveniently classified into seven divisions, which are briefly discussed as follows:—

Soil Types

(1). The limestone clays comprise some of the most productive country in the north. The formation is generally undulating to hilly, and dairying is the chief industry.

(2). Brown clay soils of the previously bush-covered hills. These are generally very responsive to the application of lime and superphosphate or basic phosphates. There are two grades of fertility in the brown clays; one is closely allied to the first group (limestone soils), while the other is more similar to the infertile sandy gumland soils.

(3). Brown sandy soils of the coastal belt. Unfortunately these are not very extensive, but where they do occur good pastures may be grown. They are not particularly deficient in lime, and superphosphate alone will generally give a good response.

(4). The leached gumland soils, both the sandy and the silty types. This group contains some of the most mature podsol soils in the world. Podsols are soils which have been formed under conditions of intense leaching. The bases—calcium, magnesium, potassium, and sodium—are mostly carried away in the drainage water. The familiar and obnoxious "pan" is formed by a cemented layer of alumina and iron compounds. This hard pan has the combined effect of preventing free drainage and the passage of plant roots to lower levels. Plants do not thrive until an efficient drainage system is established. The gumlands are very deficient in organic matter (humus), lime, and phosphates, and the silty type responds well to heavy dressings of lime and superphosphate The sandy gumland soils are not so easy to grass, and the fertility level is much lower than the silty type.

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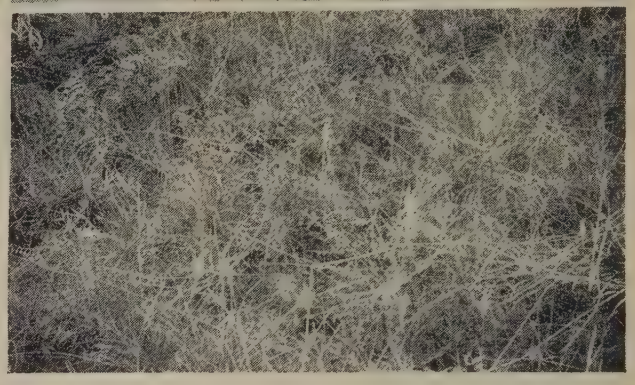

Top left.—Limestone country topdressed with phosphates and lime.

Top right.—Topdressed hill country in the Manganui County. This type of country will revert rapidly unless the grasses and clovers are fed with phosphates and lime.

Bottom.—A type of sward which, with its present constituents, may give disappointing results from topdressing. Danthonia, browntop and fern are the dominant species; clovers are conspicuous by their absence.

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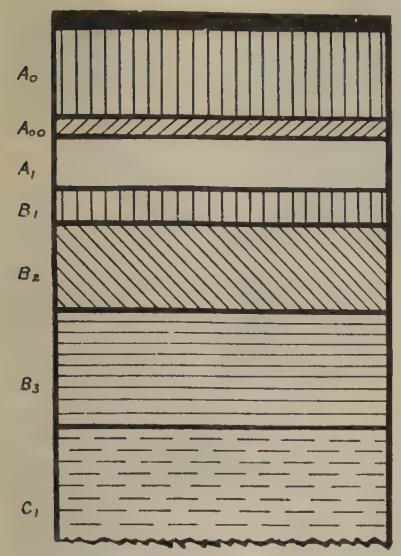
The following diagram illustrates a cross-section of a typical podsol (sandy soil):—



Black layer at top.—Litter (leaves, grass, and other forms of surface cover).

Ao.—Partially decayed organic matter (reddish brown).

Aoo.—Raw humus (black).

A1.—Grey layer.

B1.—Precipitated humus (dark brown to black).

B2.—Compact iron and aluminium accumulation, yellowish to reddish brown sandy loam (sometimes iron pan).

B3.—Friable yellow sandy loam.

C1.—Friable yellow sand downward (parent material)

[After Lyon and Buckman.

(5). The clay flats are represented by stable soils with a well-defined profile; they are often known as "meadow soils."

(6). The peats are formed by an accumulation of organic matter from which air has been excluded, generally because of a high percentage of soil water. The usual processes of oxidation and aerobic bacterial activity are hindered and an acid humus soil results. The largest areas of this type are found in the Kaitaia and Waihopo swamps. They do not respond to phosphatic fertiliser until they have been drained.

(7). The skeletal soils of the steep hills. These may be regarded as recent soils which have not yet fulfilled their development. There are large areas in the Kaitaia district.

Suitable Fertilisers

Experimental work carried out by the Department of Agriculture has indicated avenues along which the exploitation of fertilisers can be carried out profitably.

Most of the soils in the Kaitaia district respond to applications of phosphate and lime. In the past considerable quantities of basic slag have been used, and this fertiliser has given payable results.

Experimental work and general farm practice have demonstrated that slag alone is not superior to superphosphate and lime. A suitable dressing for gumland podsols and the red-brown soils is superphosphate at 3cwt. per acre and lime at 1 ton per acre initially and 5cwt. per acre in subsequent annual applications. Where transport costs are high and on the steeper country, basic super at 3wt. per acre is recommended. The sand belts respond well to dressings of superphosphate alone at 3cwt. per acre. There are indications, also, that potash is deficient on the sand and sandy peat country. Dressings of 30 per cent. potash salts at the rate of 1 to 2cwt per acre can be given where there is a response.

There is a good deal of deteriorated country and pastures of low fertility in the far north, and emphasis must be laid on the fact that dressings of phosphate (in any form) and lime may not be payable on many of these low-producing areas. Pastures composed of low-fertility grasses (such as, for example, browntop, bay grass, and danthonia) with a dearth of clovers and a consequently low available content of nitrogen, may give disappointing results when topdressed with lime and phosphate.

Investment in fertilisers should therefore be capitalised by feeding pastures which are capable of utilising the plant foods contained in the fertilisers. Expression can be given to this by topdressing paddocks containing a reasonable amount of white or subterranean clover and *Lotus major*.

The writer wishes to acknowledge advice given by Mr. Norman H. Taylor, Soil Survey Division.

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Practical Points in Sheep Dipping

Close Attention to Manufacturers' Directions Is Essential

J. E. DUNCAN, Wool Instructor, Livestock Division, Wellington.

THE usual order is to put the ration sheep or "killers," wethers, and store sheep through the dip first, then the ewes, next the rams, and finally the lambs. The reason for this order is that the store sheep, being the hardiest, take the chill off the wash for the ewes, which still further warm it up for the rams, with which the least risks must be taken on account of their value. Finally, after dipping the other sheep, the wash can be diluted to the correct strength for the lambs.

Dip manufacturers usually recommend a weaker dip for lambs and for Merino sheep, because both have tender skins which are easily scalded by a wash which is too concentrated, particularly where it is an arsenical one. Apart from this the very dense fleece of the Merino absorbs and holds a greater quantity of the fluid than in the case of crossbred sheep with their more open wool.

Suitable Conditions

Some reference has already been made to the various factors which govern the time of dipping and among these the weather is the most important. Very cold weather is obviously to be avoided on account of the risk of chilling, and also, contrary to the opinion of a number of farmers, neither is very hot weather the best for the job. Where dipping must be done under these conditions, which frequently prevail at this time of year, it is wisest to cease the dipping during the hottest part of the day.

It is a good plan, in more ways than one, to bring in the sheep the previous evening and yard them overnight, making a start with the dipping first thing in the morning. This gives the sheep plenty of time to empty and ensures that the bath and draining pens will not be unnecessarily fouled with droppings. It also guards against the sheep entering the wash in an overheated condition which is liable to result in scald.

This is the second of a series of three articles on dips and dipping. The first, published last month, dealt with the parasites infesting sheep, and the third, to be published next month, will deal with the different types of dipping baths including plans and diagrams. Later these three articles will be published together in bulletin form.

If dipping has to be done on cold days, it should finish at noon so that the sheep have time to dry and get a feed before nightfall. The latter is particularly important because a full bellied sheep does not die nearly so readily from cold and exposure as an empty one. Even on hot days dipping should cease in time to let the sheep dry before dark, as warm days are frequently followed by cold nights.

Sheep should not be dipped when they are wet after rain, as this dilutes the dip and lessens penetration. A light shower after the dip has dried in the fleece will usually do little harm, although a fairly heavy shower falling before the sheep have properly dried is nearly always detrimental and may in some cases lead to scald by washing the dipping ingredients down on to the skin in increased concentration. Where sheep with a fairly good growth of wool have been dipped with one of the better class poisonous dips (powder or paste) and have had time to dry properly they can stand a lot of rain without it having any serious effect on the efficiency of the dip.

Summing up, it may be said that the best weather for dipping is moderately cool with low humidity—i.e., good drying conditions.

Mixing the Wash

Inefficient or wrong preparation of the wash is one of the two most fruitful causes of unsuccessful dipping. The other is insufficient immersion, to be mentioned again presently.

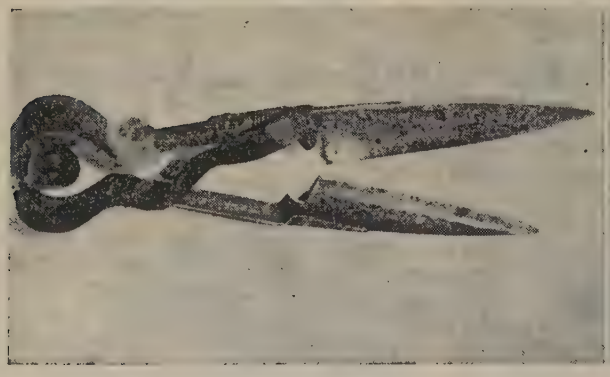
In the first place the manufacturers' instructions for mixing the dipping preparation must be followed to the letter. The dip is known to work best when it is prepared under a certain exact set of conditions. These have been carefully worked out by the maker, and are not given to be "improved" upon at the discretion of the user.

Careless mixing is found most often in the case of the powder dips, because they are a little more difficult to prepare. On no account must the dry powder be poured into the bath. It may seem that such an injunction is unnecessary, but actual cases of men doing this have occurred. The powder must be mixed by adding water, little by little, to a creamy consistency and then left to soak, preferably overnight. The mixing is usually done in empty petrol tins or oil drums. With large baths sometimes a special mixing tank of several hundred gallons is employed. This is an excellent feature and could with advantage be more widely employed, as it makes for added accuracy in mixing and any quantity can be conveniently run into the bath to replenish it when necessary.

Where the mixing is done in tins, just before use a gallon of water should be added to each tin containing the contents of a packet of dip, and thoroughly stirred. The best practice is then to pour the contents into the bath through a fine mesh sieve which will catch any lumps which may possibly have remained. These lumps (if any) are returned to the tin and broken up, and the tin is swilled out with water—which is done in any case. If more dip is to be used it should be put to soak in plenty of time to wet it all thoroughly.

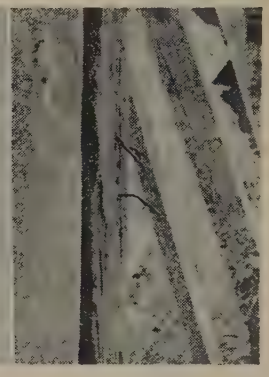
THE DO'S AND DONT'S OF SHEEP DIPPING

Muster sheep in ample time for dipping—preferably the night before. Hold them in the yards overnight to empty. *Never* dip overheated sheep after a long drive.



SHEAR-CUTS

BITING DOGS



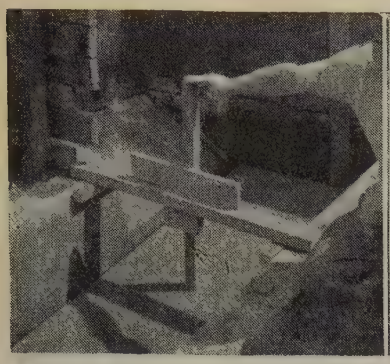
PROJECTING NAILS

Wounds caused by any of the above are an open road to infection if not properly healed by dipping time. If extensive they may also possibly lead to absorptive poisoning. The remedy should not be neglected just because it is so obvious.

Any sheep requiring dagging should be attended to before going through the dip. Failure to take this common sense precaution leads to unnecessary fouling of the wash.

Proper preparation and mixing of the dip is very important. Powder dips, in particular, should be thoroughly soaked and then again diluted just before adding to the bath.

Printed directions on the labels of packets and drums are not put there for ornament. They should be read and followed to the letter to ensure the best results.



Don't guess quantities—remember that all sheep dips are more or less poisonous and correct dilution is important, not only for best results, but for safety's sake.

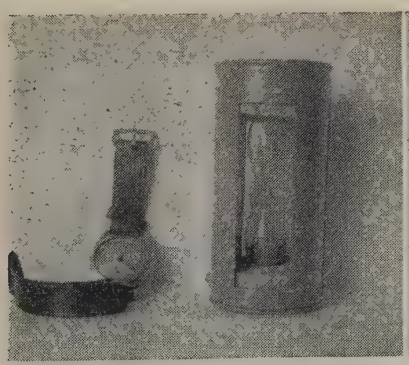
THE RIGHT WAY—Where sheep are put into the dip singly, by hand, the correct method is to slide them in gently, rump first.

This means that the sheep get the least possible knocking about, and there is less chance of their swallowing the dip or getting it into their lungs.

THE WRONG WAY — Sheep should not be dumped into the dip head first as they are much more likely to swallow or "aspirate" the wash.

Apart from that, they frequently make a last minute effort to jump out of the dip, usually knocking themselves about in the process.

Adequate immersion is essential for thorough penetration of the dip through the fleece. The manufacturers usually recommend a full minute to be on the safe side.

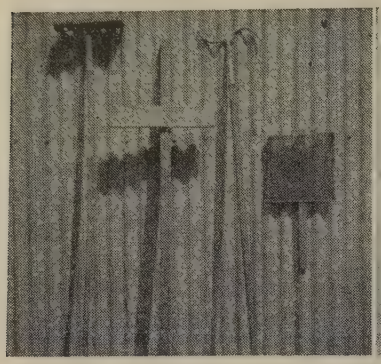


A watch is better than guesswork, but a one-minute sandglass is better still, as it is so convenient and easy to use.

In using the crutch, duck each sheep's head twice. Push it down firmly but *not* roughly, and release immediately. *Never* duck a sheep when it is coughing.

Don't rely on the sheep to keep the wash in the bath agitated where a powder dip is being used. Make use of the plunger at regular intervals.

OVER.



Here are four essential implements required to carry out the dipping operation properly. From left:—plunger, dipstick, crutch, and wire mesh skimmer.

Scum should not be allowed to accumulate on the surface of the dip, where it may be aspirated by the sheep, and will lead to staining of the wool.

Neither should droppings be allowed to accumulate in the draining-pens, where they block the gutters, foul the dip and lead to its more rapid deterioration.

The sump is an important unit and must be kept clean and in good working order, for on it depends the cleanliness and effectiveness of the dipping fluid.

The draining pen on the left contains the correct number of sheep. That on the right is too tightly packed; result—incomplete draining, waste of dip, liability to scald.

On hot days allow the sheep to dry in the shade to prevent scald, and for the same reason never drive them any distance while still wet.

When emptying the dip avoid running it out over pastures. Where a gravel subsoil is available, a sump like that shown is a good method of disposal.

Dipping over, the bath should be thoroughly cleaned out and not left till the following season. Wooden baths should be left full of clean water to prevent shrinkage.

Dip packets should all be burnt and not left lying about, as they are a source of danger to such stock as calves, which are prone to lick them.

Capacity of Bath

The dilution of the wash should be the exact strength as recommended on the container. To get this it is necessary to know accurately the capacity of the bath. This must be carefully ascertained as soon as a new bath is built. Measured quantities of water—say, 50 gallons—are run in at a time, and permanent marks made on the side of the dip bath. On a farm there may be no accurate measuring vessels available (a kerosene tin **doesn't** hold exactly four gallons as usually supposed), but they can be standardised by using weighed quantities of water (10lb equals one gallon). Since permanent marks on the bath tend to become obliterated it is a wise precaution to mark **two** dipsticks at the same time. One for use and one spare if the other gets lost. A still further precaution is to duplicate the measurements on the dipstick by marks or notches on some permanent object, such as a doorpost in the woolshed.

If the wash is to be left standing for some time in the bath the level should be carefully checked before and after this period and corrected if necessary before dipping more sheep, because evaporation concentrates the wash—and rain dilutes it.

All types of wash should be thoroughly mixed, but the necessity for keeping a powder dip thoroughly mixed and agitated cannot be too strongly stressed, because it is a suspension and not merely a solution. Figure 1 shows what happens with inefficient agitation. Half the powder particles are at the bottom of the bath where they are quite useless.

The usual implement for mixing the wash is a plunger of the type shown in Figure 1. It will be seen that by pulling it straight up and down it creates powerful eddy currents and the holes in it assist in this respect.

The best implement for thoroughly mixing a powder dip in one of the long types of baths, in addition to the plunger, is simply a 6in x 1in plank with a chamfered edge at the lower end. From Figure 2 it will be seen that by pushing this plank, held on the slope, along the bottom of the bath, very efficient mixing can be obtained (see Figure 3). The plank should be used whenever there is a lull in the dipping.

The movement of the sheep is **not** alone sufficient agitation in the case of a powder dip. It will be noticed in Figures 1 and 2 that there is a thick accumulation of sediment at the entrance end of the swim bath. This is due to the counter-current set up along the bottom of the bath by the moving sheep depositing most of the sediment at one end. Special attention should therefore be paid to this point.

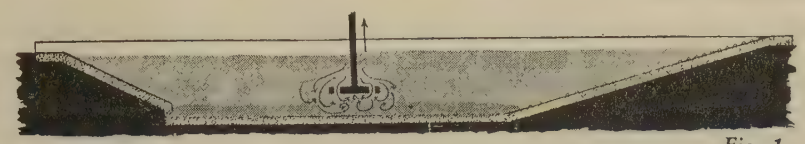


Fig. 1.

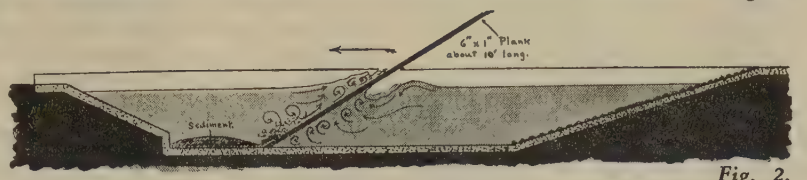


Fig. 2.

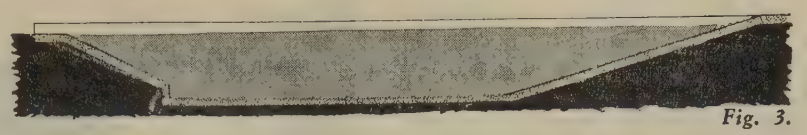


Fig. 3.

Two methods of stirring a dip.

Removal of Scum

The effect of hard water on the mixing of the dip has already been mentioned. During dipping no scum should be allowed to accumulate on the surface of the wash, the reason being that with a powder dip this scum holds large quantities of dip particles, and being so concentrated is very dangerous if accidentally inhaled by the sheep.

In non-poisonous dips it is also undesirable on account of the organic matter it holds tending to reduce the strength of the wash. It should be kept constantly removed by a wire gauze skimmer or in the case of a swim bath an ordinary fine-tooth garden rake is a useful implement. All other gross impurities such as sheep dung and vegetable matter should be removed. They not only foul the bath and the sheep, but if left they sink and carry down with them appreciable quantities of dip particles, which are locked up in the sediment and rendered useless. It is also held that accumulated organic matter has a rapid deteriorating effect on the carbolic type of dips.

It would be appropriate here to mention length of time the wash can be used. A clean wash will not deteriorate appreciably on standing for a few weeks—dips of the non-poisonous type, due to their volatile constituents, lose in strength if left too long. A very foul wash will change both chemically and due to bacterial action if left for long and is then not safe to use again. Quite apart from that it is also likely permanently to stain the wool. The other common cause of dip-stain is an insufficiently mixed wash.

Quantity of Dip

The dip manufacturers, although they would like to, are reluctant for trade reasons to recommend any definite number of sheep after which the wash should be discarded. The reason is that if one maker conscientiously recommended emptying the bath after dipping 6000 sheep, he would perhaps lose trade by doing so, because some of his rivals might claim that their dip was the better one because it could dip 10,000 sheep. It might, but the question is: how effectively? At present there is no accurate test of when to discard the wash, but there is no doubt such a test could be worked out if there was a demand for it.

The amount of wash necessary for the annual dipping depends on the number of sheep to be dipped and the density and length of their wool. Lambs may carry out only a quart of dip each, but for an average New Zealand crossbred sheep carrying two months' growth of wool the figure might be taken roughly at an average of three quarts per sheep. On this basis the approximate quantity of wash required can be calculated, allowing of course for the part left in the bath

after it gets below dipping level. Actually the more dip retained in the fleece the more effective are the results likely to be.

Frequently in the past it has been advocated that arsentical dips should be mixed with and used in combination with the coal-tar-cresol type of dips. It is inadvisable for the farmer to do this because frequently more harm than good will be done. In many cases the liquid dip interferes with the proper suspension of the particles of powder dip.

If the farmer wishes to combine the action of these two dips he should purchase the combination type where the mixing has been done by the maker; in this case there is no fear of any detrimental action taking place —no reputable firm would market such a dip.

Thorough Immersion

Insufficient immersion is the second great cause of unsuccessful dipping. It is necessary that the wash should reach and thoroughly saturate the skin of the sheep for the best results to accrue, and in sheep carrying a good growth of dense greasy wool this takes an appreciable time. The makers of practically all dips recommend a minimum of one minute in the wash. This is to safeguard both the farmer, from unsuccessful results, and themselves from complaints about the non-success of their dip.

It has been found that complete saturation can be obtained in less than a minute with lambs and short-fleeced sheep, but for sheep carrying a heavy, dense fleece a full minute is desirable. Therefore the manufacturers are quite justified in recommending this as a minimum, and the conscientious man will examine the first few sheep through the wash to make sure saturation is complete.

Low temperatures and hard water (which can be used with powder dips) both tend to retard the penetration of the wash. But it should not be thought that high temperatures are desirable—for, as already mentioned, this is likely to lead to scalding. A few appear to think that increasing the strength of the wash will compensate for a short immersion. This is a fallacy and is likely to be doubly expensive due to the greater quantity of dip used and the scalding likely to ensue.

Tight packing of the sheep in a pot bath, or too narrow a swim bath, will compress the fleeces and help to retard penetration. The action of swimming and movement thoroughly opens all the staples of the fleece and gives maximum saturation. As the sheep swim they should be checked occasionally—particularly in a straight swim bath—and pushed gently backwards. This further opens the fleece, due to the reversal of the flow of wash past it.

While in the bath each sheep should have its head immersed twice, gently but firmly, with plenty of breathing space between the two duckings. It has been found that ticks and lice often flock into a sheep's ears for safe refuge when it is in the bath, and unless the head is thoroughly immersed a complete kill of the parasites may not result. Particularly in the case of non-poisonous dips, which are not very lasting in effect, this is one of the "mysterious" causes of reinfesta-

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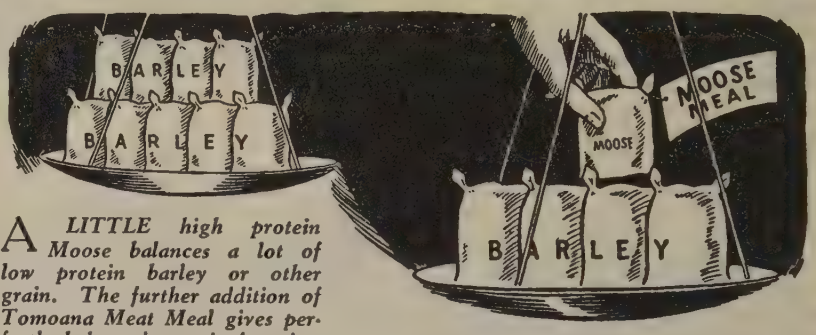

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tion. Sheep must not be hurried through the wash—some can't swim as fast as others, and the slow ones act as a desirable check.

Condition of Sheep

Any sheep which are dirty round the hindquarters should be dagged before being put through the dip to prevent undue fouling of the wash. The idea of leaving the sheep for a while in the yards to empty has been mentioned, and care should also be taken to see that they are not thirsty, as there is a possible danger that they will swallow some of the wash or lick each other while in the draining pens. Dipping sheep on a full stomach gives them a bigger shock and may lead to drowning or even in extreme cases a ruptured diaphragm if they struggle violently.

Sheep should not be put through the bath straight from a long drive, or hot and panting after being dogged round the yards, because, firstly, their pores are open and a certain amount of scalding is likely to result, and secondly, due to their rapid breathing they are likely to "aspirate the wash" into their lungs and contract mechanical pneumonia. Lastly, if they are bitten or "heeled" by the dogs, there is a danger of poisoning through such wounds.

Rams in condition for service, or other sheep or lambs in high condition, should not be dipped if it can be helped, although sometimes if infested rams are brought in just before tupping this cannot be avoided. Apart from the fact that such rams are in an excitable condition their skin is usually flushed and very liable to scald. Heavy unwieldy rams are also naturally bad swimmers, and care has to be taken in piloting them through the bath.

With valuable stud animals it is an extra precaution to put a bridle on each ram to assist in controlilng it, and it is frequently advisable to immerse these animals only once. In a case where ewes have been dipped shortly before service, a week should be allowed to intervene before turning out the rams.

Conversely sheep in a very low condition should not be dipped, but if this cannot be avoided they will need special care to prevent drowning. Neither should very hungry sheep be dipped, as they cannot resist the shock so well. Ewes may be dipped right up to within two or three weeks of lambing if they are carefully handled and assisted through the bath. The walk-in type of entrance is far superior to all others in this respect.

Dipping of Lambs

Many farmers are averse to dipping their lambs, although this is not always a wise policy, for in cases where the lambs are not shorn the ticks, and to a less extent the lice, have a tendency to migrate to them from the ewes and they may become heavily infested with consequent loss in condition. Most of the dip manufacturers state that it is perfectly safe to dip lambs ten weeks old or over and since the makers have their reputations to protect, it may be taken that this allows a good margin of safety.

It is not really desirable to dip unweaned lambs, not so much due to the danger of dipping, but rather to the danger of mismothering, which is considerable, because ewes know their lambs by smell which the dip partially hides. If ewes and lambs have to be dipped they must be separated and the lambs kept away from their mothers for two or three hours, till the ewes are quite dry.

If sheep have been given an arsenical worm drench it is a wise precaution to allow a week to elapse before putting them through an arsenical dip, otherwise the amount of arsenic getting into the system might be excessive.

As already stressed, it is essential that **every** sheep on the farm should be dipped, and if for any reason, such as sickness, wounds, etc., sheep cannot be dipped at the same time as the others, they must be isolated until such time as it is possible to do the job. If at all possible it is also a wise plan to dip about the same time as your neighbours, for only by constant vigilance of this sort can a flock be kept clean.

The sheep should not be tightly packed in the draining pens or they will rub and chafe together and scald-

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ing is likely to result. This really cannot be blamed on the dip, for the writer knows of an instance where some Southdown hoggets wet with rain were tightly penned in the woolshed for a while, and this was quite sufficient to cause them to scald and lose big patches of wool afterwards. Also the sheep must be allowed to remain in the draining pens until they have stopped dripping—mainly to economise the wash but also to some extent to prevent dripping on the herbage.

After draining it is desirable that the sheep should be allowed to dry in the shade, because quite apart from minimising the risk of scalding, slow drying enables the dip (particles) to become evenly distributed throughout the fleece, giving maximum and lasting protection. On no account must sheep start at once on a long drive while still wet with dip. They will heat up, absorption of dip will take place ,and scalding is almost sure to follow.

Follow Instructions

Considering the many millions of sheep which are dipped in this country every year, and recognising the fact that Nature never intended sheep to wallow in a bath of poison, the number of losses at dippings are by no means high. Reputable dip manufacturers take every care to see that their products are thoroughly tested and standardised before being offered for sale and are also careful to maintain this close supervision constantly through all stages of manufacture. They always supply along with the dip full instructions for its use, but further than this they cannot go.

The dip is merely a tool in the hands of the farmer for accomplishing a definite task, and if he chooses to ignore the instructions or go contrary to them, he cannot blame the dip for killing his sheep any more than he can blame his motor-car for knocking down a pedestrian if he handles it wrongly.

Another point might be mentioned here. In spite of any claim made by farmers writing testimonials, or even by the manufacturers themselves, the process of dipping cannot improve the wool on clean, healthy sheep. The wool which has already been grown cannot be improved upon, although it can easily be damaged in a variety of ways, but dipping, by ridding a sheep of parasites, can improve its general condition and consequently indirectly improve the wool which is yet to be grown.

Causes of Losses

The following is a brief list of some of the most common causes of losses:

1. General rough handling of sheep in getting them into the bath. This leads to sheep aspirating wash, some of which enters their lungs and causes mechanical pneumonia. It includes also tumbling too many sheep into a pot bath, resulting in abrasions and some sheep submerging others, and also dipping when the wash is too low in the bath.

2. Extensive wounds such as shear cuts, dog bites, or abrasions may give trouble in two ways. Firstly, by absorption of the dip into the system, followed by poisoning; secondly, because such wounds may become infected with various organisms. Arsenical dips have much less germicidal value than is often supposed and even a carbolic type of dip may infect a

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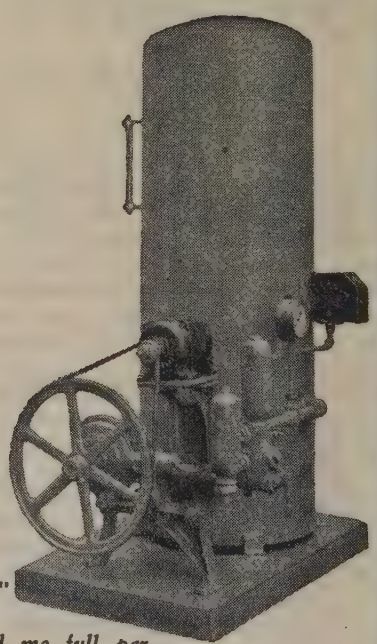

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wound if the wash is allowed to become very foul. A point that should be watched in this connection is the dipping crutch, the ends of which should be quite blunt. The writer knows of a case where the crutch had gradually become worn on the concrete until the points were sufficiently sharp to cause punctured wounds on a number of the sheep below the jaw. Several losses resulted from these wounds becoming infected with the bacillus of malignant oedema (blood poisoning).

3. There are always a few sheep in a large flock in a precarious state of health, but not recognised by the farmer. A sheep may have very delicate lungs and the slight chill from dipping, which has no effect on the other sheep, is sufficient to cause its death through pneumonia. Again it often happens that hoggets are very weak through worm infestation, but the owner may believe it to be due to the external parasites which are also present. The shock of dipping is just sufficient to kill these sheep instead of giving them a fresh start, as the owner erroneously thought it would.

4. Contrary to general opinion, post mortem examinations of sheep lost at dipping have shown that only very rarely is death due to poisoning following swallowing of the wash. In most cases the dose they swallow has no more bad effect on them than many of the poisonous drenches given to rid them of worms. Cases are recorded from time to time where sheep have been poisoned by eating herbage contaminated with poisonous dip which has dripped on to it from insufficiently drained sheep, but even here the degree of contamination is seldom high enough to be fatal, except in cases of herbage in small pens packed with wet sheep. What has happened too frequently, however, is that other stock such as calves have been poisoned by chewing the empty dip packets which have been left lying about. This is only the result of gross carelessness, as these packets can easily be destroyed by burning.

5. Mechanical pneumonia due to dip entering the lungs is the one very common cause of losses—ordinary pneumonia is the other, and is brought about by conditions already explained, e.g., empty-bellied sheep not drying before nightfall. Rams and other sheep in high condition are particularly susceptible to chill.

It should thus be realised that to blame the dip out of hand for any losses, without further investigation, is hardly a fair thing.

After Dipping

When the dipping proper has been completed the few items still require attention to really complete the job:—

(i) The sheep should be taken back to their paddocks in leisurely fashion even after they have dried.

(ii) The vicinity of the bath should be generally tidied up and all old dip packets burnt. Empty metal containers are too valuable to be destroyed, but they should be washed out to minimise risk of accidental poisoning to stock. Any repairs to the pens, bath, etc., should be attended to, and not left till next season, when perhaps the time will be ill spared to see to them.

(iii) The bath should be emptied and cleaned, and if a wooden one, filled with clean water at once. Other types can be left empty without damage. The drainage from the bath must not be run out over a paddock where it will scorch the herbage and upset the stock, even if it doesn't poison them. The best method of disposal where the bath is on the flat is to dig a deep sump of a larger capacity than the bath, and fill this up with large stones. The foul wash will then soak harmlessly away, with this qualification—that such a sump must **not** be near a well used for drinking water.

(iv) If any of the men employed during dipping have got their clothes saturated with the fluid it is just as well for them to change at the first opportunity and wash themselves thoroughly as a precautionary measure.

(v) Any farmer who takes a real interest in his sheep will keep an eye on them for some time after dipping, even if it is only to note their general condition, and whether the parasites have all been killed. When losses do sometimes occur after dipping it is not infrequently the case on a large property that they may go unnoticed for days or even weeks afterwards. Should the owner then call in expert advice it will be very difficult to determine the cause of death.

Frequently the farmer in question cannot even remember the exact weather conditions at the time of dipping. This state of affairs is both unsatisfactory to himself and to the makers of the dip, who will often be blamed although their product was not at fault.

Photographs illustrating this article were taken by H. Drake, A. L. Bryant and the author.

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Intending applicants are hereby notified that applications for registration under the Dairy Factory Managers' Regulations should reach the Registrar, Dairy Factory Managers' Registration Board, C/o. Department of Agriculture, Private Bag, Wellington, on or before 1st May, 1940. Forms are available from the Registrar.

Attention is drawn to the fact that under the Regulations, any application which is received by the Board after the 1st May, shall not, except in special circumstances, be considered by the Board until after 1st May, 1941.

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Field Experiments Show That Crop Offers Promise to Growers

A. G. ELLIOTT, Crop Experimentalist, Wellington.

ALTHOUGH linen flax is new to New Zealand, the practice of cropping it is older than history. Linen wrappings have been found in Egyptian mummy cases 7,000 years old, and from the dawn of civilisation linen fibre has been highly valued for its fineness and strength. Even in these days, when other fibres and fabrics have challenged its supremacy, it is indispensable both in peace and war; for although wool, cotton and natural and artificial silk have largely taken its place for clothing, it is still unrivalled for fabrics where great strength must be combined with lightness.

The experiments and trials in the growing of linen flax in certain parts of the South Island have shown promising results, and have justified the arrangements of contracts with farmers for the growing of flax on a commercial scale. There are indications that this valuable commodity may give a good return to farmers whose land is suitable for the growing of the crop.

Serious Shortage in Britain

In peace time Great Britain requires about 60,000 tons of linen fibre each year, and draws only 2 per cent. of her supples from Empire countries. In war time her requirements are enormously increased, and overseas supplies are drastically curtailed. In 1935, 60 per cent. of British imports were drawn from Russia and the Baltic states. Realising the importance of the maintenance of supplies, the Government of Northern Ireland, some time before war broke out, voted a grant of £9 for every £1 subscribed by the linen industry for the extension and improvement of home-grown flax up to a maximum of £50,000 a year for three years.

Old Methods

Until very recently the production of linen fibre could be carried on only where there was an abundance of cheap labour. This explains why Britain draws nearly all her supplies from foreign countries and why no attempt has been made hitherto to establish the industry in New Zealand. To make clear what is involved, it is worth describing the procedure followed by the Irish small farmer even to the present day.

When ready to harvest, the crop was pulled by hand, laid on the ground with the stems parallel and the butts all one way, and then tied into bundles with wisps of flax. A man of average skill would pull from one-fifth to one-quarter of an acre a day. The moist Irish climate in conjunction with the low value of seed made it uneconomic to try to save the seed, so the whole crop immediately after pulling was put into pits of water, or ponds, or slowly moving streams, to "ret." The bundles were weighed down with turf and stones to keep them below the surface of the water until the ret was complete.

Unpleasant Job

"Retting" (rotting) is a process of decomposition in which bacteria destroy the gummy substances which bind fibre bundles to the woody core and thus make it easier to separate the bundles from one another and from the other tissues. The ret generally takes about a fortnight, but considerable experience and good judgment are required to decide exactly when to re-

move the crop from the water. If removed too soon, the fibre is not easily separated from the wood and the spinner cannot split up the fibre bundles sufficiently finely, whereas, if left too long, the fibre is weakened and becomes "cottony."

When he decides the time is right, the farmer wades into the pond (usually about waist deep) and throws the bundles of flax on to the bank. This is an unpleasant job, because the retted straw is heavy, slimy, and has a most offensive smell. The bundles of straw are then untied and spread out thinly on the grass to dry. When dry, the straw is tied up again and carted to the scutching shed, where the brittle woody core is broken up into short lengths by pounding the stem throughout its length with a mallet or between grooved pieces of wood. This must be done in such a way that the core is well broken up while the surrounding fibre is undamaged.

An excellent crop of linen flax grown in the Marlborough district.

"Scutching"

The next step is to "scutch" or beat out the broken wood from the fibre, and this is done by holding a handful of straw over the edge of a board and beating down on it close to the edge with a wooden scutching blade. The hand scutching blade was replaced about 1870 by the scutching wheel, in which a number of blades were set in an axle and the wheel was driven by a treadle, and later by water power.

During the scutching process a certain amout of fibre is broken and beaten out with the "shives" (broken wood), and this short fibre is later cleaned and sold as tow. The scutched line fibre is bought in the market by the spinner, who has to "hackle" (comb) it to the required degree of fineness before it can be spun.

The majority of farmers would grow only one or two acres, and in addition to variation in the retting water and in soil and weather conditions, there was great difference in the skill with which the individual prepared his fibre, so that the spinner started his work under the disadvantage of having to buy a large number of small lines of widely differing quality.

The Modern Way

It is obvious that, with the wages paid in New Zealand, the cost of production by the methods outlined would be absolutely prohibitive. But advances made by research workers in all branches have entirely altered the outlook. Plant breeders have evolved new varieties of flax capable of giving much higher yields per acre of fibre of improved quality. Machines for pulling the crop at the rate of about seven acres a day are now available, a system of retting in warm water tanks has been perfected, and vast improvements have been made in machinery for de-seeding and scutching the crop.

Now, instead of each individual grower producing and marketing his own fibre, farmers would grow crops on contract for a central processing plant capable of handling the produce of perhaps 1,200 acres, and their job would be finished when they delivered the crop to the factory. This mechanisation and centralisation relieves farmers of all skilled technical work, and makes it possible to contemplate the establishment of the industry in New Zealand with excellent prospects of success.

Investigations in N.Z.

Much information has been obtained regarding the growing and harvesting of the crop in Great Britain and on the Continent, and more recently in Kenya, Australia and Canada; but, valuable though this is, it was not safe to assume that it could be applied directly to New Zealand conditions. Therefore, a comprehensive programme of experiments has been carried out by officers of the Agronomy Division of the Plant Research Bureau in collaboration with officers of the Fields Division of the Department of Agriculture in order to obtain information on numerous questions, of which the more important are:—

(1) The most suitable varieties to grow.
(2) The soil and climatic conditions required.
(3) The districts in which there is a sufficient area of suitable land to feed a central factory.

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Contains Copper Sulphate (Bluestone), Nicotine-Sulphate, Arsenic and Cobalt combined in the correct proportions to act as a parasiticide. The medicinal dose of Arsenic also acts as a tonic. Cobalt has been found useful in small doses, especially in certain parts of N.Z.

Price 7/6 for 672 Lamb Doses.
Price 4/6 for 336 Lamb Doses.

Manufacturers: TINGEY & HUBBARD LTD., Chemists, FEILDING.

(4) The yields likely to be obtained.
(5) The best rate of seeding and best spacing.
(6) What manure to use.
(7) The best time to sow.
(8) The best depth to sow.
(9) The best stage to harvest the crop.
(10) The best method of harvesting.
(11) What diseases are likely to be important.
(12) Fibre quality obtainable.

To give the results of all the experiments carried out would take up too much space, so it is possible here to give only briefly the conclusions reached.

Conclusions Reached

(1) Liral crown has been used in all experiments to date, and has proved to be a good all-round variety. Stormont Cirrus, Stormont Gossamer and Giza Purple are included in this season's experiments, and it is believed that they may prove more satisfactory under certain special conditions. A supply of Liral Prince, claimed to have a particularly high percentage of fibre will be available for experiments next year.

(2) Experiments have been carried out on a wide variety of soil types, ranging from light silty loam to heavy clay. It seems likely that a medium loam overlying clay will give the best general results. Too light a soil is liable to dry out excessively and stunt the growth of the crop, and heavy clay may be very difficult to work sufficiently finely to give the even stand that is so desirable. With too rich a soil the crop grows coarse and is very liable to lodge. Dirty land should be avoided, as linen flax does not compete well with weeds, and heavy infestation of fat-hen may well make the crop valueless for fibre.

The weather has an important effect on yield, as an adequate, but not excessive, supply of moisture is essential.

(3) There are very large areas of suitable land in the South Island, in Marlborough, and round about Rangiora, Ashburton, Timaru, Oamaru, Balclutha, Gore, and Invercargill. The North Island, on the other hand, is not considered suitable because of the risk of severe rust infection in its warmer moister climate.

Yields from Trials

(4) The following table gives the average yields obtained in various districts, and shows very clearly the effect of weather conditions. The spring of 1937 was very dry in Otago and Southland, with the result that yields were only half those of the following season, when there was ample rain.

Yields in Cwt. per Acre.

1937-38.	Total crop.	Seed.	Deseeded Straw.	Fibre.
N. Canterbury 5 trials	57.0	7.6	42.6	5.0
S. Canterbury and N. Otako 3 trials	36.0	4.1	29.2	4.3
Southland 3 trials	34.0	5.1	23.0	2.1
Weighted average	45.0	6.0	33.6	4.2
1938-39.				
Rangiora 28 trials	41.5	3.03	30.5	5.18
Ashburton 4 trials	56.6	4.12	44.0	7.68
Timaru 3 trials	49.5	3.03	36.9	5.95
Oamaru 5 trials	69.6	4.94	52.8	10.20
Balclutha 7 trials	69.8	4.34	51.6	8.34
Gore 3 trials	80.4	5.83	56.1	9.47
Invercargill 6 trials	86.2	6.98	62.3	9.53
Dominion weighted average	55.7	4.02	41.2	7.10

For comparison with the New Zealand figures, the following yields of fibre from various overseas countries in 1938 are interesting:—

	Cwt. per acre.
Netherlands	6.71
Germany	5.18
*Great Britain and N. Ireland	4.41
Ireland	4.05
European average	4.17
*U.S.S.R.	1.96
*Canada	3.57

*1937.

(5) In all the trials carried out by the Fields Division the seed was drilled in at the rate of 100lb. per acre in rows approximately 3½ inches apart. In trials at the Agronomy Division the same quantity of seed per acre in 3½-inch drills gave a

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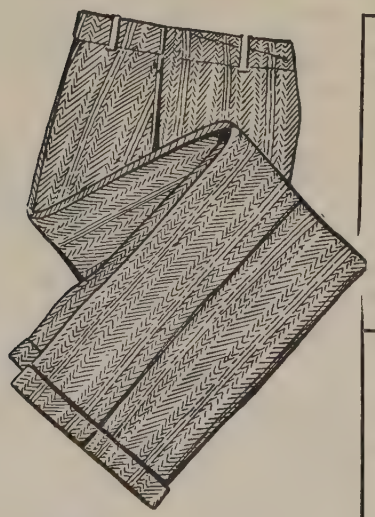

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50-per-cent. greater yield than in 7-inch drills or in 7-inch cross-drilled or broadcast; but as there are practical difficulties in the use of a 3½-inch drill, it is very desirable to repeat this experiment on a large scale to see if this increase in yield is maintained. In all experiments, where the rate of seeding ranged from 50 to 125 lb. per acre, increase in seeding has given an increase in yield. This, however, must be balanced against increased cost of seed.

Manuring

(6) Manuring will naturally vary with local conditions. Superphosphate or reverted superphosphate up to 3cwt. per acre can confidently be recommended under all ordinary conditions. Potash has given an increase in fibre percentage at Lincoln, and is claimed on the Continent to improve fibre quality. It should certainly be used in any district that shows potash response. Sulphate of ammonia should be used cautiously, if at all. It is liable to injure germination and to give too rank a growth in a good growing season, but in a backward season a light dressing may be well worth while.

(7) It is not possible to lay down hard and fast rules as to the best date to sow. Certainly, nothing is to be gained by hasty preparation of the ground and sowing before the ground gets warm. On the other hand, late sowing may carry the crop into hot weather, with a consequent considerable reduction in yield and an increased risk of rust infection. In Australia it is customary to sow linen flax in the autumn so that the crop can mature before the dry weather sets in, and it was thought that autumn sowing might be useful here, partly for the same reason, and partly to enable the crop to get away before spring weeds become troublesome. But although autumn sowing, if done just at the right time, does largely overcome the weed problem, unfortunately the time within which sowing must be done is so very short as to make it far too risky. If the crop makes more than about 2 inches growth before cold weather checks it, it is liable to be beaten flat by winter rains and not get up again, and if it makes less growth than this it is liable to be lifted by frost, with severe mortality.

(8) On experimental plots, sowing 1 inch has given the best results. With shallower sowing, birds get a lot of the seed, and with deeper sowing much of the seed fails to come up.

Autumn-sown plots of linen flax. In the foreground seed broadcast; left, sown in 3½-inch drills; right, sown in 7-inch drills.

Harvesting

(9) It is not always easy to decide just when to harvest the crop. If harvested too early the yield will be low, and although the fibre will be soft and fine it will lack strength. If allowed to become over-ripe, the fibre will be coarse and harsh. Generally speaking, it is ready to pull when the stem has turned yellow from one-third to half-way up and the leaves to that distance have withered and dropped. But in some seasons the stems do not change colour, and then the safest guide is to cut across a number of average seed bolls and squeeze them. If moisture can be squeezed out the crop is not ready for pulling; if no moisture can be squeezed out, pulling can start.

(10) In Britain and Western Europe flax crops are always pulled, never cut. In Australia, on the other hand, they are usually cut with a binder. If cut with a binder there must always be some loss of fibre in the stubble, and this may be excessive if the paddock is rough and the crop short in the straw. Further, in wet harvest weather the cut ends of the sheaves in stook may become partly dew-retted, resulting in still further loss of fibre.

Machines which will pull the crop perfectly satisfactorily are available, but the tying apparatus leaves something to be desired, as the sheaves are frequently badly butted. The relative merits of the two methods can be determined only by field-scale experiments.

Diseases of Linen Flax

(11) Linen flax is subject to the same fungous diseases as linseed, and in New Zealand there are four of these, namely, wilt, rust, stem-break or browning, and pasmo.

Under local conditions wilt is perhaps the greatest menace to successful cultivation of linen flax. Infected plants simply wilt and die at any stage of growth. Seed harvested from a diseased crop carries the wilt fungus, which enters the soil where the seed is sown. There it can persist to infect subsequent crops, even after an interval of 11 years. If both seed and soil are free from the disease there is little prospect of infection from any other source.

Flax rust, which forms bright orange or shining black patches on leaves and stems, is quite distinct from the cereal rusts. When it attacks the stem it greatly reduces both yield and quality of fibre. As spores of the fungus are carried in large numbers by the wind, rust is difficult to control, but trials which have been carried out indicate that in a normal season the majority of crops are little affected.

Stem-break and browning are both caused by the same fungus. When this organism attacks the plant through the cotyledons the stem collapses close to soil-level; hence the name stem-break. This fungus is also responsible for a blight of leaves, stems and bolls which appears shortly before harvest. To this phase of the disease the name

"browning" is applied. Browning substantially lowers the quality of seed and fibre.

Pasmo is very similar both in appearance and effects to browning. Both these diseases are seed-borne, but unlike wilt, do not carry over in the soil when flax is grown in rotation with other crops.

Disease in linen flax can be very largely prevented if two fundamental precautions are taken—firstly, the avoidance of land which has at any time carried linseed in which symptoms of wilt were observed, and secondly, the sowing of seed which is free from wilt, browning or pasmo. A system of control is being elaborated which will ensure that clean seed is always available.

Satisfactory Report

(12) Samples of straw from the various experimental plots were sent to England for reports on quality, and, in addition, half a ton of straw was shipped to be retted and processed. The majority of samples were considered to show considerable promise, and the fibre from the bulk lot was valued by a firm of Irish spinners at £100 per ton, which is considered very satisfactory.

The conclusions reached from these experiments are that there are large areas in New Zealand capable of producing linen flax, that satisfactory yields can be expected, and that fibre of a quality acceptable to British buyers can be grown.

It remains to be seen whether the experimental results can be reproduced on a commercial scale, what the cost of production will be, and what sort of return the grower can expect. This information can only be obtained by processing the crop from a few hundred acres on a commercial processing plant.

In order to make the necessary arrangements for this, Mr. J. W. Haddfield, Director of the Agronomy Division, has recently spent some months in Europe investigating the latest methods of production and in purchasing the necessary machinery, which will be operated by Messrs. Donaghy & Co., Ltd., at Waikuku, near Rangiora. This machinery is capable of processing dew-retted straw, tank-retted straw and unretted straw, and careful records will be kept so that a decision can be reached as to which method is best adapted to New Zealand conditions. Contracts have been arranged with farmers in that area for the growing of some 300 acres to supply the crop.

Inevitably trade and shipping was dislocated to some extent by the outbreak of war and some delay in delivery is likely, but it is hoped that a pulling machine will be available in time to harvest some of the crop. A delay for a few months in delivery of the breaking and scrutching machinery and the reticulation system for the retting tanks is not important, as flax improves in quality by being stacked for some time before being processed.

It is regretted that, through pressure on space for topical articles, it has been necessary this month to omit the instalment of "Grasses and Clovers of New Zealand." This instalment, which makes a start with clovers, will be published next month.

A History of the . . .

NEW ZEALAND DAIRY INDUSTRY

by

H. G. PHILPOTT, Dairy Division, Department of Agriculture.

In this book, for the first time, the historic details regarding the development of New Zealand's great industry have been gathered together — the work of the pioneers, the founding of the dairy factories, refrigeration, co-operation, establishment of export trade, grading, home-separation, importation of dairy cattle, legislation, etc.

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Certificate-of-Record Testing of Purebred Dairy Cows

Contributed by the DAIRY DIVISION.

The following list includes details of the production of cows which have been awarded certificates during the period 1st to 15th February.

YEARLY DIVISION—FIRST CLASS.

Jerseys.

Name of Cow and Class	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season:		
				Days	Milk	Fat
		Yrs. Dys.	lb.		lb.	lb.
Junior Two-year-old						
Erinview Carnation	J. Murray, Woodville	1 354	275.5	365	10,591.8	629.23
Bokaboa Gold Bangle	Mrs. J. Larsen, Cheltenham	1 271	275.5	349	8,851.5	599.28
Erinview Cis	J. Murray, Woodville	2 28	278.3	365	10,552.0	573.35
Bokaboa Lenora	Mrs. J. Larsen, Cheltenham	1 270	275.5	334	8,294.0	542.27
Bokaboa Lucy	Mrs. J. Larsen, Cheltenham	2 12	276.7	365	8,000.9	530.94
Crofton Perfect Queen	A. J. Luxton, Omata, Taranaki	2 35	279.0	365	7,811.3	511.88
Crofton Rose Marie	A. J. Luxton, Omata, Taranaki	2 69	282.4	365	7,888.6	507.78
Tolgarth Enid	H. H. Sutton & Sons, Waihi	1 362	275.5	365	8,977.0	506.71
Brookdell Bubs Trixie	N. M. Colson (for Est. J. R. Colson) Waitoa	2 1	275.6	365	8,581.4	488.33
Windermere Devotion	V. McD. Hitchings, Otorohanga	2 27	278.2	365	7,227.3	457.79
Alphalea Buttercup	J. H. Jordan, Hope, Nelson	1 361	275.5	365	8,505.1	437.95
Bokaboa Dimple	Mrs. J. Larsen, Cheltenham	2 12	276.7	365	6,305.9	437.20
Glen Oak Prim's Tulip	W. J. Olley, Ormond, Gisborne	2 28	278.3	365	8,133.6	432.52
Springvale Victress	H. Wilson, Hastings	2 33	278.8	362	7,450.5	427.45
Alphalea Pretty	J. H. Jordan, Hope, Nelson	1 319	275.5	365	6,821.4	402.93
Meadowland Devoreen	F. O. R. Phillips, Otorohanga	2 2	275.7	335	7,213.8	401.13
Springdale Roseleaf	H. Wilson, Hastings	2 54	280.9	365	7,217.4	398.69
Helston Prunella Dean	J. T. Hill, Bunnythorpe	1 344	275.5	365	7,583.4	397.74
Alphalea Nina	J. H. Jordan, Hope, Nelson	2 8	276.3	365	7,257.1	394.71
Glen Oak Heather Bell	W. J. Olley, Ormond, Gisborne	1 339	275.5	365	7,659.2	393.28
Blythewood Racilia	J. A. Russell, Palmerston North	1 358	275.5	246	5,354.5	319.24
Meadowland Aspire	F. O. R. Phillips, Otorohanga	2 42	279.7	325	5,977.2	314.64
Senior Two-year-old						
Bokaboa Dulcie	Mrs. J. Larsen, Cheltenham	2 342	309.7	365	12,121.8	735.38
Tolgarth Sola	H. H. Sutton & Sons, Waihi	2 341	309.6	365	11,379.5	649.46
Tolgarth Golden Mace	H. H. Sutton & Sons, Waihi	2 309	306.4	365	10,990.3	598.44
Bokaboa Susie	Mrs. J. Larsen, Cheltenham	2 222	297.7	365	8,040.5	523.93
Glamorgan Soumise Nonie	Stan. G. Morgan, Eltham	2 349	310.4	365	9,135.4	497.76
Crestdale Passing Fancy	V. McD. Hitchings, Otorohanga	2 342	309.7	362	9,116.6	477.61
Waipiko Calona	W. G. Gibbs, Takaka, Nelson	2 307	306.2	349	8,327.6	412.76
Wattle Grove Choice	W. Robinson, Patumahoe	2 269	302.4	316	8,151.9	371.92
Blythewood Thatia	J. A. Russell, Palmerston North	2 351	310.6	248	6,512.3	370.91
Waipiko Lovenot	W. G. Gibbs, Takaka, Nelson	2 325	308.0	365	6,109.3	339.08
Three-year-old						
Erinview Jest	J. Murray, Woodville	3 357	347.7	365	12,817.4	742.69
Erinview Gold Drop	J. Murray, Woodville	3 11	313.1	365	13,580.2	676.69
Te Ara Pretty Bloom	W. E. Thomas, Feilding	3 361	348.1	365	12,293.4	635.54
Tolgarth Flirt	H. H. Sutton & Sons, Waihi	3 234	335.4	365	10,537.2	587.71
Silverdale Gold Trail	G. Hodgson, Whakapara	3 13	313.3	365	8,566.5	502.16
View Hill Emerald	F. Kirton, Papakura	3 71	319.1	365	7,815.5	425.66
Four-year-old						
Erinview May	J. Murray, Woodville	4 334	381.9	365	14,217.5	717.75
Brookdell Golden Queen	N. M. Colson (for Est. J. R. Colson) Waitoa	4 21	350.6	365	9,683.3	518.60
Princess Oxford Ixia	N. M. Colson (for Est. J. R. Colson) Waitoa	4 342	382.7	345	8,711.0	498.80
Sea View Silver Leaf	H. Purdie, Brixton, Waitara	4 292	377.7	258	8,508.1	409.14
View Hill Dolores	F. Kirton, Papakura	4 25	351.0	346	7,246.9	408.32
Mature						
Everest Elfies Girl	H. Purdie, Brixton, Waitara	9 357	385.0	365	10,893.0	706.62
Squires Golden Beauty	J. H. Williams, Waharoa	6 316	385.0	365	12,385.2	671.27
Snow View Charming Girl	H. Purdie, Brixton, Waitara	5 210	385.0	365	12,076.4	631.37
Windermere Didims	V. McD. Hitchings, Otorohanga	5 35	385.0	365	12,860.7	627.54
Helston Highland Lass	J. T. Hill, Bunnythorpe	5 37	385.0	365	10,611.0	581.49
Oxford Seraph	J. H. Williams, Waharoa	7 65	385.0	365	9,536.1	522.31
View Hill Phoebe	F. Kirton, Papakura	7 133	385.0	364	10,769.2	511.89
Silodale Everlasting	A. G. Somervell, Takapau	5 263	385.0	365	9,333.2	493.84
Burncroft Springtime	G. A. Mills, Ohaupo	5 15	385.0	365	8,588.9	476.60
Oddicombe Cleopatra	M. N. Trotter, Katikati	5 215	385.0	337	7,787.8	446.18
Fern Oak Tulip Girl	F. O. R. Phillips, Otorohanga	5 56	385.0	365	8,517.9	434.95

Friesians.

Junior Two-year-old						
Ahikouka Pioneer Olga	C. A. Knutson, Dalefield	1 339	275.5	365	15,492.5	568.87
Koromiko Patricia	M. J. Parker, Dalefield	2 1	275.6	346	11,381.7	428.85
Totara Converter Lulu	Piri Land Co., Auckland	1 289	275.5	365	10,430.4	419.19
Sealands Magpie Inka	H. G. A. Cameron, Weraroa	2 35	279.0	365	8,232.2	408.28
Totara Superior Butterfly	Piri Land Co., Auckland	2 14	276.9	365	11,001.4	399.55
Totara Converter Cola	Piri Land Co., Auckland	2 101	285.6	365	10,818.5	382.61
Totara V.S. Buttercup 2nd	Piri Land Co., Auckland	1 340	275.5	365	10,655.8	380.76
Ryvington Banner Girlie	M. C. Hodgson, Tamahere	1 335	275.5	364	9,567.6	356.50

Friesians (Continued).

Name of Cow and Class	Tested by	Age at Start of Test.	Fat required for Certificate.	Yield for Season:		
				Days	Milk	Fat
		Yrs. Dys.	lb.		lb.	lb.
Ahikouka Forest Beets	C. A. Knutson, Dalefield	2 11	276.6	185	10,270.8	319.18
Wescoll Mercena Annabel 36th	Wesley College, Paerata	2 133	288.8	352	7,696.2	311.16
Senior Two-year-old						
Totara V.S. Janet	Piri Land Co., Auckland	2 363	311.8	365	14,328.5	492.35
Junior Three-year-old						
Totara V.S. Buttergirl	Piri Land Co., Auckland	3 99	321.9	365	15,870.5	567.44
Mahoe Dusenberg	R. A. Wilson, Bulls	3 59	317.9	327	12,406.3	468.46
Mature						
Totara V.S. Buttercup	Piri Land Co., Auckland	5 285	385.0	357	18,994.2	759.84
Totara Forest Lass	Piri Land Co., Auckland	8 14	385.0	365	18,642.9	722.94
Ahikouka Wakalona Echo	C. A. Knutson, Dalefield	5 352	385.0	365	22,576.7	722.08
Totara Netherland Buttercup	Piri Land Co., Auckland	8 31	385.0	344	19,282.0	687.08
Sealands Ideal Princess	H. G. A. Cameron, Weraroa	6 33	385.0	345	14,051.3	569.29
Mahoe Naupata	R. A. Wilson, Bulls	6 284	385.0	365	14,398.2	535.44
Mahoe Elder	R. A. Wilson, Bulls	5 37	385.0	336	12,790.8	530.80

Milking Shorthorns.

Mature						
Woodbine Duchess 5th	W. M. Barnett, Tai Tapu, Christchurch	5 273	385.0	334	9,835.1	444.42

YEARLY DIVISION—SECOND CLASS.

Jerseys.

Junior Two-year-old						
Bokaboa Rosie	Mrs. J. Larsen, Cheltenham	2 61	281.6	365	8,252.5	499.71
Middlewood Bonnet	Mrs. J. Larsen, Cheltenham	2 55	281.0	365	6,588.7	423.84
Ku Ku Neat Owlette	J. H. Williams, Waharoa	1 343	275.5	365	7,940.3	420.32
Brookdell Cora	N. M. Colson (for Est. J. R. Colson) Waitoa	2 21	277.6	365	7,449.3	410.49
Woodlands Rosemary	S. W. Grindlay, Otakeho	1 319	275.5	365	5,406.9	341.25
Senior Two-year-old						
Bokaboa Petal	Mrs. J. Larsen, Cheltenham	2 275	303.0	365	9,188.6	604.27
Three-year-old						
Raeburn Oxford Plume	J. S. Rae, Taneatua	3 345	346.5	365	8,772.2	559.53
Mature						
Meon Mistletoe	M. N. Trotter, Kati Kati	6 21	385.0	329	8,966.5	509.10

Friesians.

Junior Two-year-old						
Wescoll Mercena M. Natalie 35th	Wesley College, Paerata	2 56	281.1	357	12,114.1	457.91
Wescoll Mercena G. Queen 35th	Wesley College, Paerata	2 50	280.5	365	11,525.5	376.79
Totara Marathon Attila	Piri Land Co., Auckland	1 361	275.5	365	9,604.0	373.87
Senior Four-year-old						
Totara P.L. Eileen	Piri Land Co., Auckland	4 315	380.0	365	14,372.7	495.70
Mature						
Mahoe Louise	R. A. Wilson, Bulls	6 335	385.0	362	13,386.6	524.50
Vernon Premium Lass	Wesley College, Paerata	6 318	385.0	365	10,370.0	509.63

305-DAY DIVISION—FIRST CLASS.

Jerseys.

Junior Two-year-old						
Hazelwood Pearl	H. Purdie, Waitara	2 46	255.1	305	8,648.3	505.45
Tolgarth Cara	H. H. Sutton & Sons, Waihi	1 364	250.5	305	6,809.9	415.32
Tolgarth Winsome	H. H. Sutton & Sons, Waihi	2 —	250.5	305	6,355.8	374.59
Te Ara Floss	W. E. Thomas, Aorangi	1 362	250.5	305	7,371.3	371.33
Pinewoods Sybil's Melba	W. J. Olley, Ormond	2 5	251.0	305	5,503.3	350.14
Waipiko Lorica	W. G. Gibbs, Takaka	1 323	250.5	305	4,768.3	272.01
Three-year-old						
Te Ara Gem	W. E. Thomas, Aorangi	3 41	291.1	305	9,448.4	494.85
Tolgarth Eve	H. H. Sutton & Sons, Waihi	3 40	291.0	305	8,575.2	444.77
Four-year-old						
Meon Orleander	J. S. Rae, Taneatua	4 24	325.9	305	8,507.8	600.18
Glen Oak Dinah's Choice	W. J. Olley & Sons, Ormond	4 343	357.8	305	8,788.2	509.10
Tolgarth Sadie	H. H. Sutton & Sons, Waihi	4 322	355.7	305	9,035.1	454.41
Te Ara Beatrice	W. E. Thomas, Aorangi	4 7	324.2	305	7,249.7	363.04
Mature						
Silverdale Golden Leaf	Geo. Hodgson, Whakapara	7 192	360.0	305	9,367.3	511.14

305-DAY DIVISION—SECOND CLASS.

Friesians.

Junior Two-yearold						
Totara Converter Butternut	Piri Land Co., Auckland	1 326	250.5	305	9,473.1	307.22

The Control of Cockroaches

World-wide Common Domestic Pests

J. MUGGERIDGE, Government Entomologist, Plant Research Bureau, Nelson.

COCKROACHES are found in dwellings, on board ship, in stores and warehouses, or in fact anywhere where there is heat, moisture, and food sufficient to sustain them. In general appearance they are oval in outline, and the flattish body is well adapted for squeezing through cracks and crevices or suchlike openings which afford suitable refuge during the day. The two pairs of wings fold closely over the body, from which arise the long antennae or feelers and spiny legs (Fig. 1.B.). When scurrying for shelter they rely mostly on their legs for speed, although retreat may be hastened somewhat with occasional short flights.

There are four species of cockroaches which are almost cosmopolitan in range, although one of these, the Oriental cockroach (*Blatta orientalis* L.), as far as can be ascertained, fortunately has not yet become established in this country. The three other species are as follows.

Four Species

(1) The American cockroach (*Periplaneta americana* L.) (Fig. 1.D.E.) is the largest of the common species, and measures 1½ inches to 2 inches when full-grown. It has long antennae, strong reddish brown wings, and long conspicuous spinldy legs. Specimens of this large species continue to reach our shores, having been transported in packing cases containing various kinds of goods which come from such places as Java, Singapore, and California.

(2 The Australian cockroach (*Periplaneta australasiae* F.) (Fig. 1.A.B.C.) resembles very much the American cockroach, but is smaller in size, measuring only 1¼ inches long. It is easily distinguished from the American species by the bright yellow markings on the outer edges of the basal halves of the fore-wings.

(3) The German cockroach (*Blatella germanica* L.) or croton bug (Fig. I.F.) as it is referred to in America, frequents stores or houses. It is very common throughout New Zealand, and is frequently found in dwellings. It is the smallest of the species under discussion, and measures about 5-8ths of an inch in length. The wings are light brown in colour, the body being slightly darker than the wings. Its small size, and the two dark broad stripes between the head and the wings serve to distinguish it from the other species.

> Many New Zealand houses are troubled with cockroaches, which are common domestic pests the world over, and in this article the methods by which they can be controlled are discussed. There are three species to be found in the Dominion, including a native variety, but all have similar characteristics.

(4) The New Zealand cockroach (*Platizosteria novae-zealandiae*), or Maori bug (Fig. 1.G.) is a native species. It is a broad black wingless insect, with dark brown legs and long antennae. Unlike the other cockroaches, it does not usually frequent dwellings, etc. It is fond of damp situations, and may be found among debris, particularly about old decaying wood heaps. Its evil-smelling propensities are its chief claims to distinction.

Life History

In spite of the fact that cockroaches are common pests, comparatively little was known about their life history until recent years.

The eggs are laid in leathery pod-like capsules, which contain 16 or more eggs, according to the species. The time taken to hatch out varies from five to ten weeks or more. The young cockroaches closely resemble the parent, but lack wings. In Fig. 1.C. a young cockroach is pictured. A further nine or ten months is occupied in reaching the adult stage, although both egg and adult stages may take longer or shorter according to temperature conditions. It has been stated by one observer that the German cockroach may pass through two or three generations a year.

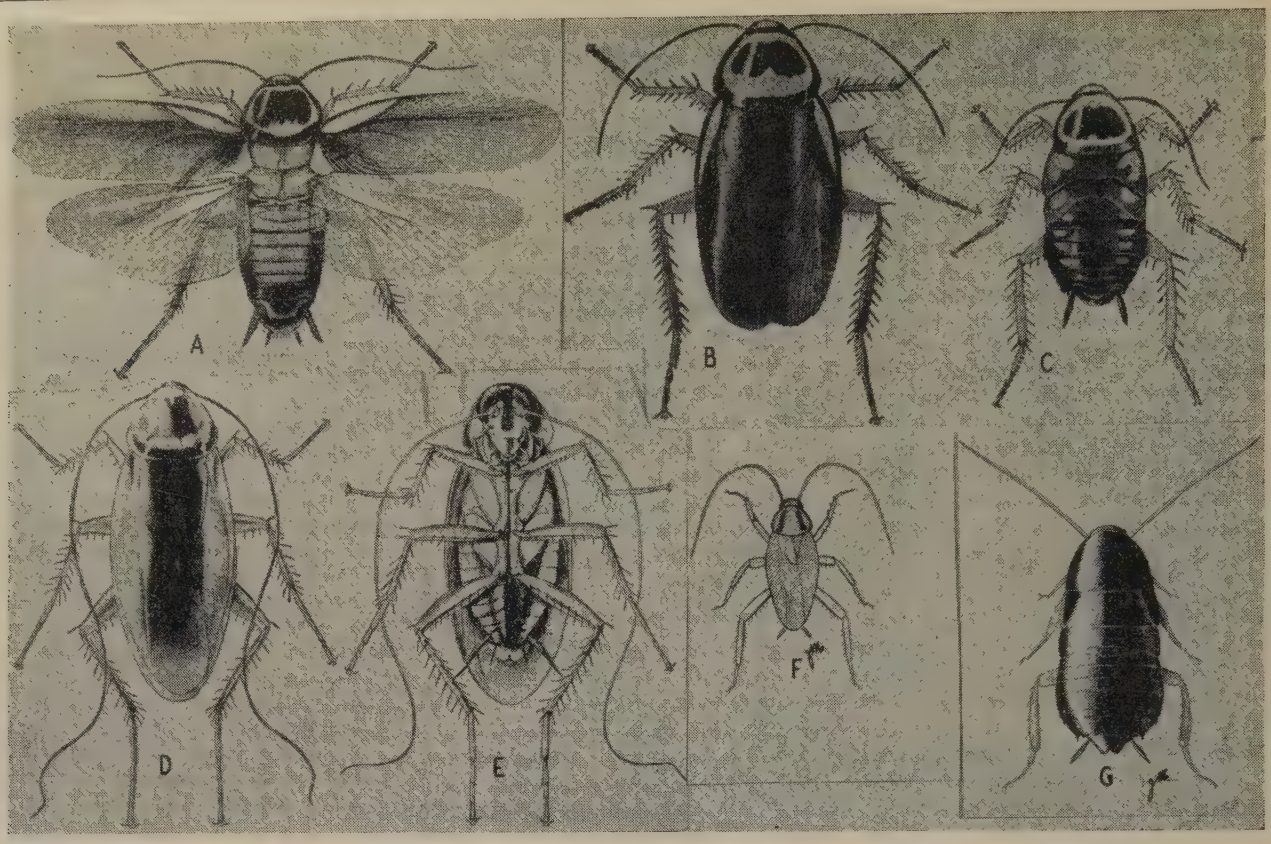
Habits

Cockroaches are nocturnal in habit, and prefer a community existence. They hide during the daytime in dark places, such as between wallboards or in cupboards. Cracks in the walls or openings formed through improperly fitting boards are often a convenient place of retreat for them, and it is in places such as these that they are most difficult to get at. Positions near hot water pipes, behind warm radiators, or, in fact, any places where the temperature can be considered comfortably warm, would be found to be suitable places of retreat.

They are omnivorous in their tastes, and are very partial to sweet substances. The amount of food they consume is perhaps the least objectionable of their bad habits; it is their contamination of food and their offensive "roachy" odour that makes them such obnoxious pests. Because of their nocturnal habits, a place which is infested with cockroaches may seem innocent enough in the daytime, but when darkness falls and the insects come out to search for food, the sudden switching on of a light discloses their presence, when they will scurry away to their places of concealment. The cockroach has at times been thought to be a carrier of disease, but there is no experimental evidence to show that this is the case.

Control Measures

Numerous control measures are recommended against roaches, and these vary according to circumstances. Generally, the most effective method of control is fumigation, but because of the expense and the difficulties associated with this measure and the fact that it requires an experienced person to carry it out, it is hardly practicable for the average householder. When a campaign against these pests is to be



A and B: The Australian cockroach. Note the broad marks on the fore-wings. C: Young or nymphal stage of Australian cockroach. D and E: The American cockroach viewed from above and below. F: The German cockroach, or "croton bug." Note the dark parallel bands between the head and wings. G: The New Zealand cockroach or "Maori bug."

[Drawings A to E after Back.

undertaken, particular attention must be paid to their places of concealment. All cracks and crevices behind which they are likely to hide should be stopped up where possible.

The American entomologists generally favour sodium fluoride powder as the best all-round substance for use in the control of roaches. It has distinct drawbacks, however, in that it is a very irritant poison, and must be kept away from children, food, and domestic pets, but provided proper precautions are taken, no harm will result from its use. The container in which it is kept should be labelled "poison" and be put in a safe place. As a further precaution, a small amount of soot mixed with it would help to distinguish it.

Places behind which roaches are suspected of hiding, and which cannot be dealt with in the ordinary way, may be reached by blowing the insecticide in as a dust by means of a pair of bellows or some form of duster. In accessible places the insecticide should be sprinkled around so that the insects will have to pass through it when on the way to their retreat or when foraging for food. As they pass through the dust it adheres in minute quantities to their feet and antennae, and in the process of cleaning these organs the powder is transferred to their mouths and swallowed.

Sodium fluoride will prove effective over a long period so long as it remains dry, but in the presence of moisture it cakes and becomes useless. It must be borne in mind, however, that even though moist, it is still as poisonous as ever except in so far as the insects are concerned, because it cannot then be picked up by them as formerly. After the powder has been down for a while it should be cleaned up by means of a vacuum cleaner, and if necessary the treatment should be repeated at intervals of a few days.

Pyrethrum

Pyrethrum is on the market in a number of proprietary forms either in dust or liquid form. Because of the fact that it deteriorates very rapidly it is probably a good deal less effective than sodium fluoride. It has the advantage, however, of being non-poisonous to human beings, and may therefore be used in places where the poison hazard from the use of sodium fluoride is too great. Powdered forms of pyrethrum may be applied as described above for sodium fluoride. On the other hand, liquid will be effective only if sprayed directly on to the bugs, a difficult procedure which may be effective up to a point but will not be likely to succeed in eradicating the pest.

A. U.S.A. Department of Agriculture leaflet, No. 144 by E. A. Back, on cockroaches and their control has proved invaluable in the preparation of this article.

Veterinary Notes for the Farmer

Discussions on First-Aid Measures

Contributed by the Livestock Division

Ophthalmia — Blindness in Sheep

INFORMATION has been received that several sheep owners are now experiencing blindness in sheep due to the formation of a greyish white film over the front of the eyeball. This trouble is not new, and is frequently seen at this time of the year. Occasionally, cattle are also affected, especially after driving on dusty roads, but sheep are quite commonly affected.

Cause

The originating cause would appear to be irritation of the eyes from dust or foreign matter, or irritation from the seed heads in pasture. Sheep have been found affected in long overgrown pasture, and when moved to short succulent feed no further trouble is experienced. Once the disease has become established in a flock it is necessary to treat the matter seriously to prevent the spread of the trouble to all the sheep on the farm. From this angle, the condition must be considered to be contagious, and control measures will include the separation and isolation of all affected sheep from the healthy members of the flock.

A careful inspection of all the sheep should be carried out. The affected sheep should be carefully handled, as, being partially or completely blind, they may cause serious damage to themselves. A level paddock free from drains, logs, and water should be selected for their grazing until recovery takes place.

Treatment

Although some affected animals may recover without treatment it is not advisable to wait for Nature to bring about repair of the eye. The use of a suitable eye lotion will assist in removing the grey film which has formed on the anterior surface of the eyeball. An eye lotion may be prepared by mixing 6 grains of sulphate of zinc in an ounce of distilled water. Some prefer to use a nitrate of silver lotion made up at the same strength. The use of powdered glass or sugar is cruel, and should be condemned.

A few drops of the selected eye lotion should be placed on the surface of the eye, the sheep's head being held to one side to enable the drops to cover the area affected by the film. This treatment should be carefully carried out once or twice daily with all affected sheep. If a large number of sheep are to be treated a small, clean oil can will be found useful to take the place of the eye dropper. The same lotion will be found suitable for the treatment of affected dairy cattle. It is impossible to treat run cattle, as severe damage is likely to be caused through yarding and handling.

The eye lotion will be found useful in treating the film on the eye of a horse or a cow due to the presence of an awn of chaff. Frequently, the film forms over the chaff, making it difficult to remove the latter. In this case it is important to get the foreign matter removed as soon as possible.

Worms in Calves

MUCH has been written about parasites in sheep, and no doubt the cattle men are as deeply interested in the subject of internal parasites in their young calves. All young animals are subject to infection with worms.

These worms are frequently divided into those which infest the alimentary canal (stomach and intestines) and those which infest the lungs and bronchial tubes. The latter are commonly referred to as lung-worm disease, and the affected calves have a characteristic cough, the tongue often protruding from the mouth. The disease set up is often referred to as "husk" or "hoose" in calves from the husky nature of the cough.

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Symptoms

When the worms are present in the stomach and intestines the characteristic symptoms are loss of condition and anaemia, later followed by scouring. At this season of the year parasitic disease frequently shows up.

The ordinary pasture which has maintained the calf in good thriving condition up to the present time now begins to lose some of its nutriment, to become more fibrous, to become lower in protein and mineral matter, and therefore less sustaining. At the same time, the tendency is for an increase in the parasitic larvae on the pasture where calves are grazing continuously on the same area.

The increase of larvae is facilitated with warm, rainy weather and heavy stocking of calves on a pasture which is losing some of its feeding value. The fight between the parasites on the one hand and the calf on the other hand therefore favours the parasites. The parasites frequently gain the upper hand; the calf starts scouring, goes off its feed, becomes anaemic, and, unless attended, loses the battle and dies.

Many owners have recorded their experiences of how quickly affected calves slip back at this season of the year.

Effect of Feeding

It is particularly important that the chain of circumstances should be followed closely, as one of the most important lines in the treatment of affected calves is attention to the feeding of them. A change of pasture, preferably to a clean area free from contamination by calves, is desirable. A crop of aftermath following a hay crop will be found most beneficial. In the absence of this, supplementary feeding with good hay, ensilage, roots, or a small daily ration of crushed oats and linseed will give excellent results.

Many dairy heifer calves are so seriously affected with gross worm infestation during their first winter that their usefulness in after-life in the herd is seriously impaired. Because of the gross worm position now, many dairy heifers are poor producers as two-year-olds, and frequently break down and scour after calving as two-year-old heifers. Much culling of two-year-old heifers is done because of poor production, when, in reality, the animals have not had a reasonable chance owing to a severe setback due to worms in their first winter.

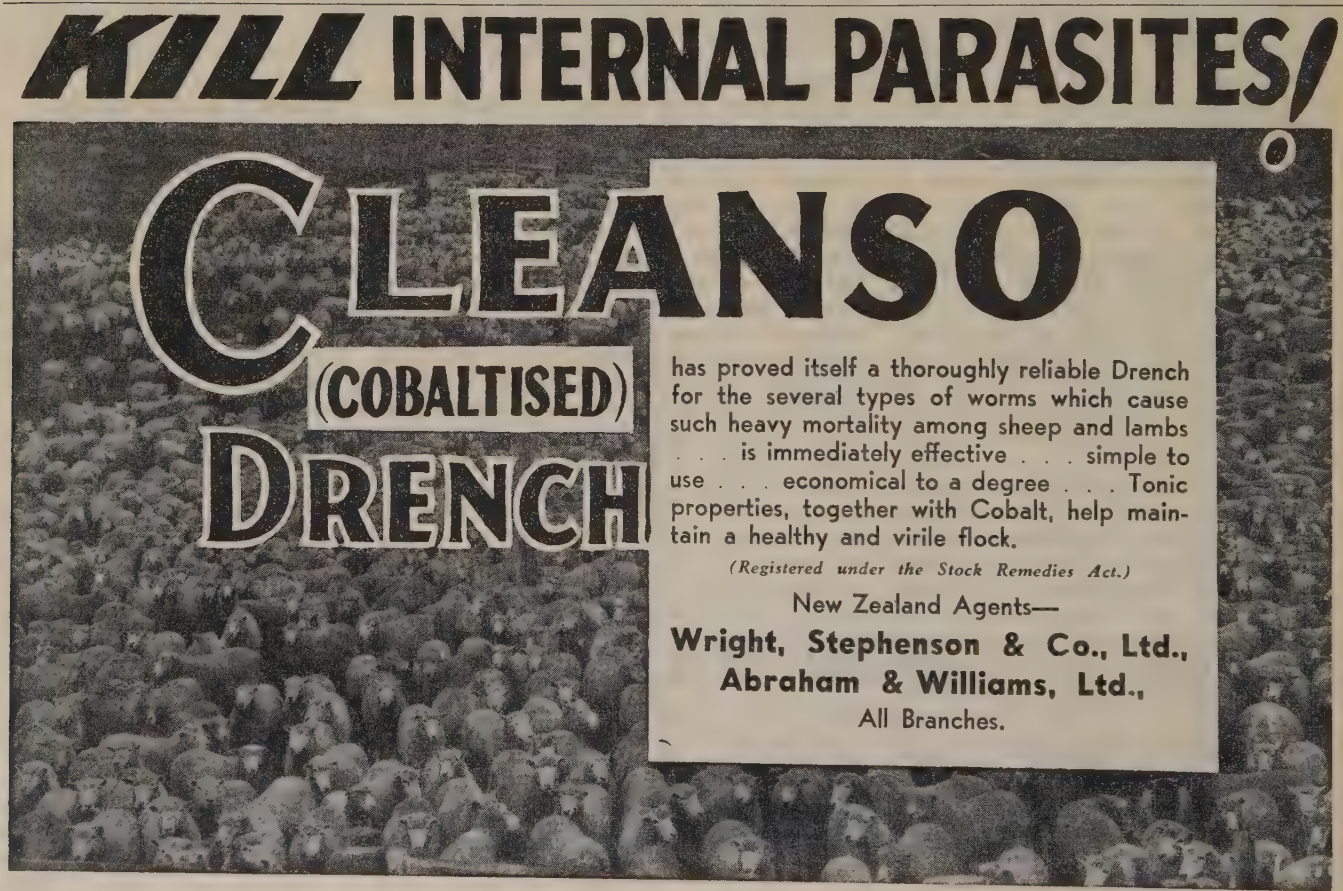
Combined with good feeding and management of the calves, worm medicine has a place, but in the absence of the former the results are not satisfactory, although losses may be checked. The dairy calves reared on many farms on low-lying or swampy country are more likely to be severely affected. Run calves, reared on the mother on steep, better-drained country, are not so badly affected, although here again exceptions to this rule are seen.

Drenches

The following drenches can be used with some effect, varying in efficiency with the parasites present:—

(1) **Bluestone.**—Dissolve 8oz. of bluestone in 3 gallons of water. Dosage: Calves, four months, 3oz.; six months, 4oz.; nine months, 6oz.; twelve months, 8oz.

(2) **Tetrachlorethylene.**—This can be used in doses of from 10 c.c. to 30 c.c. in liquid paraffin, but should be followed by a dose of Epsom salts.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Occasionally, oil of turpentine is used mixed in a pint of milk or in raw linseed oil. The dose per calf varies from a teaspoonful for young calves to two tablespoonfuls for older calves, well diluted in skim milk.

The intention of this line of drenching is to eliminate worms from the stomach and intestines, and by increased feeding and better management to build up the constitution of the calf so that it may overcome the effects of the lung-worms. The use of chloroform poured into the nostril of the calf has been tried in the treatment of lung-worms in calves. Another treatment consists of the injection into the windpipe of special mixtures for the purpose. These treatments are better given under expert supervision.

Good results are obtained from dosing for stomach and intestinal worms, followed by change of pasture, increased feeding, and a change of management so as to prevent the calf from becoming re-infested, and this line of treatment is recommended.

Answers to Correspondents

Vasectomy on Rams

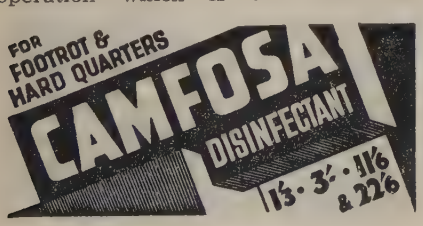
In reply to J.D.P. (Lower Mangorei), who asks for a description of the operation of vasectomy on rams for the production of "teasers," the Livestock Division writes:—

Since writing you on the 24th ultimo re the operation of vasectomy on rams for the production of "teasers" I have asked for a description of the operation as carried out by an officer of this Department. The description is given as follows:—

The operation of vasectomy as performed on rams used as "teasers" consists of the removal of a section, about one inch in length, from each vas deferens. The region selected for the operation is the anterior neck of the scrotum where the vasa may be felt as hard cords about as thick as an ordinary teat syphon. After clipping the wool around the scrotum and belly, an area about the size of the palm of the hand is shaved over the seat of the operation which is then scrubbed with soap, water, and disinfectant, after which it is painted with tincture of iodine.

The ram is secured on his back on a table, bench, or box of suitable height for convenience of the operator and a local anaethetic is injected over the cords to anaesthetise several square inches of skin. The operator stands at the rear of the ram, an assistant places his thumb or forefinger on the posterior surface of the neck of the scrotum, pressing upwards and with his other hand pulls the scrotum backwards towards the animal's tail. This manipualtion pushes the vasa deferens towards the anterior surface and the operator, after feeling the vasa by rolling it between his finger and thumb, makes a vertical incision through the skin about 1½ inches long directly over it and picks the structure up with the forceps. A piece an inch long is then snipped off with scissors. If the ram is fat some difficulty may be found in picking up the vas but in thin animals there is little trouble. The skin wound is sutured and the sutures are removed a week or ten days later. This procedure is repeated for the other vas from the second testicle.

The ideal is to perform an aseptic operation but, in practice, it may be better to smear the wounds with B.I.P.P before suturing. It is advisable to study the anatomy on a dead subject prior to operating.



Advisory Service on Veterinary Matters.

Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

Lump on Shoulder of Heifer

K.G.L. (Lepperton).

Could you please give me advice on the following matter.

I have a rising two-year-old heifer (in calf), which is due in about August, and she has a large lump on her shoulder blade (so as to speak) on the right side looking from the head. The bump seems to have a very thin skin on it, and it burst at one time, from which blood flowed freely, but has now healed again, and is getting larger. Will this bump affect her in any way, and what can I do to reduce same. Any information regarding same will oblige.

LIVESTOCK DIVISION:—

It is rather difficult to advise in this matter without knowing the exact position of the lump and some history as to the origin of it. If the lump is situated on the shoulder blade it is probably of the nature of a severe bruise, and having burst at one time may now contain pus. If situated in front of the shoulder, however, the lymphatic gland in this region may be affected with tuberculosis. In the latter case the matter requires to be reported to your nearest Inspector of Stock.

If the lump is on the shoulder blade it is advisable to paint the swelling regularly with strong tincture of iodine with a view to causing pointing of the abscess. When the abscess has reached the stage of pointing, the swelling should be opened with a clean sterile knife and all pus and bruised tissue thoroughly removed by syringing out the wound. It is possible the abscess may contain a small particle of loose bone or some piece of foreign body. An exploration of the cavity should clear up this point. All foreign matter should be removed and the wound is then allowed to heal in the usual way under antiseptic treatment. An abscess of this nature due to bruising or staking should not interfere with the animal's usefulness.

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Farm Practice and Management

Contributed by Officers of the Fields Division

Portable Pig Sty

THE accompanying illustration shows a portable pig sty built by Mr. Gerald Scanlen, Runciman, which has been in use for five or six years. The sty can be pushed or levered every few days or every day to a new position. If the sty is moved frequently the grass recovers rapidly from the treading, and soon shows growth improvement from the pig droppings and urine.

The sty is about 10ft. by 5ft. 6in. The framework is made of totara, recommended because of its lightness. The flooring in the shed is made of seasoned heart matai 6in. by 1in. plain boards, tight fitting so as to exclude draught. The 4in. by 2in. studs in the shed are heart rimu. Pigs are liable to exercise their teeth on any timber that juts out in their quarters. They often attack the studs of a shed in this way, which must therefore be of tough timber. If totara were used for these studs the pigs would soon weaken them.

The shed is 5ft. high at the front and 3ft. high at the back. The roof and sides of the shed are covered with corrugated iron, while the back is of creosoted pine with the cracks battened to prevent draught. The back could be made from kauri or totara. The wheels are made out of wood, and are 12in. in diameter. Mr. Scanlen thinks that they could be improved by enlarging their size to about 14in. so that less effort would be required in changing the position of the sty.

The wheels run on an iron axle ¾in. in diameter. A piece of ¾in. piping fitted into the wheels helps to take the wear, and a little graphite grease applied every year helps to prevent it. The iron axle runs through the studs and is secured by a nut, and the wheels are similarly held in position. They are also kept in position by washers, and are prevented from rubbing against the sty by an iron collar.

Mr. Scanlen finds that this arrangement is not entirely satisfactory, particularly for the wheels at the back of the sty, where the weight supported is heaviest. He thinks that the axle should run right across from one wheel to the other. At present the axles there have given way to a certain extent, and the tops of the back wheels rub a little against the corrugated iron sides of the shed, making the shifting of the sty more difficult.

The trough is built in to the front of the sty.

This sty will acommodate at the very most five baconers.

One man can lever or push the sty a short distance, but it is so light that one man can lift the front off the ground to swing the sty round and change the direction of travel. It is rather difficult to push up a slight rise, but it can be levered. When the sty is in motion the pigs, especially if they are large, should be kept off the flooring space.

—*J. E. BELL, Instructor in Agriculture, Auckland.*

Bringing Tussock Swamp Country Into Production

THERE are many areas of land in Southland which are quite unproductive because of the fact that no attempt has yet been made to break them in, and today they can be classed as red tussock swamps. These areas are connected generally with a low-lying stretch of country which is inadequately drained by a slow-running river or stream.

On such areas the tussock has taken such a strong hold that practically no other grass of any feed value worth speaking of is to be found. Such ground is naturally rich, and yet due to its present state of habitat it can be used only for the purpose of affording a rough summer grazing area.

In times of heavy rain such low areas may frequently become flooded due to the silted-up condition and the slow-running nature of the stream concerned. Under such conditions these lands have received frequent topdressings of rich river silt, with the result that today the ground is of a very fertile nature, except that lack of drainage is the limiting factor

Typical low-lying red tussock country with a slow-running stream.

Best Means

What are the best means by which such rich areas of good agricultural land can be brought into use and productivity?

In many cases, if the stream bed itself is lowered sufficient drainage would be obtained for the area.

A practice which is steadily increasing in popularity in Southland is that of employing a mechanically-driven scoop dredger to deepen the beds of the stream; at the same time the debris builds up the banks of the stream. This machine does splendid work, and can be operated rapidly. If sufficient fall is to be obtained several feet of spoil may be taken from a stream bed, with the result that the waters of the stream are necessarily lowered considerably.

At the same time, by deepening and straightening the course of a stream in such a manner the result may be that the actual speed of the running water may be increased, thus lessening to a considerable extent the risk of further silting up. If possible, by far the best plan is to make arrangements for the dredge to begin operations at the very outlet of the stream, and if the work is carried on for a mile or so up-stream the majority of farms in the district may benefit.

When ploughing is considered, a swamp plough must be used, and as the tussocks may be big, a large furrow is required to bury the vegetation. In some cases it may be necessary to burn the area first to get rid of the excessive growth of tussock and so enable the furrow to be turned over thoroughly.

Fallow the Land

With the heavy growth to be buried, even when the fire has been used, it is considered best to fallow the paddock for the best part of a year with a view to allowing decay to take place beneath the furrow. It would be foolish to attempt a crop from the area too soon after ploughing, as the heavy growth of tussock would cause much trouble in the actual working and sowing out of the soil.

Although not always of the very large size, these tussocks are frequently found to average more than 4ft in height and are very bushy. Even when they have been burned before ploughing, the root system and the crown of the plant left unburnt is very tough and bulky, and takes considerable time to rot. Therefore, where possible, the ploughing must be done early, and a start should be made about November if at all convenient. Fallowing, which should follow the ploughing, is given extra time, as land of this nature does not grow many weeds while in fallow.

After the action of the winter frosts has started the work of breaking down the furrow, cultivation should begin early in the spring. Following the first cultivation the area should be topdressed with 2 tons of carbonate of lime per acre or its equivalent in burnt lime, and the ground should then be worked in preparation for a turnip or swede crop. The following year, with the turnip crop eaten off, the ground should be cultivated again as early as possible and a seed bed prepared for grass. The area should be given a further 1 ton of carbonate of lime per acre and sown down in grass with oats as a nurse crop.

Pasture Mixture

The following pasture mixture should be useful in most districts:—

Certified perennial ryegrass	25lb
Certified Italian ryegrass	5lb
Timothy	5lb
Meadow foxtail	2lb
Certified Montgomery red clover	2lb
Certified white clover	2lb
Alsike	2lb
Total	43lb

—W. L. HARBORD, Fields Instructor, Invercargill.

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List of Growers

J. H. CLARIDGE, Seed Certification Officer, Wellington.

FOLLOWING is a list of growers whose wheat crops have passed both the field and grain inspections required under the Government scheme for the certification of seed wheat.

The seed from these crops is not recognised as finally certified until it has been satisfactorily machine-dressed and the sacks suitably tagged and sealed. Further lists will be published later.

Variety	Grower.	Acreage
Cross 7	Barnett, R., Dunsandel	25
	Blackwater, Est. c/o. H. Neave, Box 20, Leeston	14
	Brooks, J., Brookside	22
	Burns, J. E., Horrelville	16
	Campbell, R. & P., Kingsdown R.D., Timaru	14
	Canterbury Agricultural College, Lincoln (Line A)	23
	Canterbury Agricultural College, Lincoln (Line B)	19
	Chamberlain, A. G., Leeston	35
	Collin, F. G., Greendale	12
	Cook, R. F., Ilam Rd., Christchurch	17
	Croy, E. J., Seafield	45
	Dalzell, W. T., Hawarden (Line A)	8
	Dalzell, W. T., Hawarden (Line B)	10
	Dart, J. W. M., Methven (Line B)	12
	Dart, J. W. M., Methven (Line C)	20
	Earl, J. W., Waikari	10
	Fairbairn, J., Springston R.D., (Line A)	20
	Fraser, J., Levels Valley	25
	Harvey, W., Willowby (Line A)	10
	Harvey, W., Willowby (Line B)	10
	Healy, J., Tycho-Levels R.D.	12
	Heslop, H. H., Southbridge	22
	Horsburgh, J., Hunter R.D., Waimate	14
	Jameson, R. L., Culverden (Line A)	46
	Jameson, R. L. Culverden (Line B)	43
	Jameson, R. L., Culverden (Line C)	46
	Lambie, R. T., Leeston	12
	Lynskey Bros., Yaldhurst	15
	Marshall, D., Springston R.D.	52
	Milliken, H. M., Temuka	13
	Milne, R., Culverden	18
	Moorehead, J., "Willesden," Southbridge	21
	O'Connell, J., Hunter R.D., Waimate	37
	Oliver, H., Hororata	8½
	Prebble, R. W., Winchmore R.D.	38
	Ridgen, E., Greendale	10
	Robinson, T. C., Mt. Palm, Rotherham	65
	Sheenan, T., St. Andrews	15
	Stewart Bros., Templeton	20
	Stockdill, H. S., Amberley (Line A)	13
	Stockdill, H. S., Amberley (Line B)	7
	Sullivan, R., Albury	12
	Talbot, F. & R., Rangitira Valley, Temuka	24
	Talbot, P. R., Claremont, R.D.	60
	Threkeld Bros., Spye, Waipara R.D.	23
	Tutton, F. A., Springston R.D.	13
	Walker, W. D., Dunsandel	20
	Watson, P. A., Winchmore R.D., Ashburton	23
	Welsh, W., Cricklewood R.D., Fairlie	23
Solid Straw Tuscan	Bailey, P. V., Springston R.D.	7
	Barnett, R., Dunsandel	12
	Davison, L. H., Culverden	72
	Gardner, Est. of E., Scargill	10
	Holmes, A. G., Rakaia (Line A)	60
	Holmes, A. G., Rakaia (Line B)	27
	Honeywell, S., Mt. Hutt R.D., Rakaia (Line A)	28
	Honeywell, S., Mt. Hutt R.D., Rakaia (Line B)	23
	Hurley, Est. of H., Balcairn (Line A)	20
	Hurley, Est. of H., Balcairn (Line B)	12
	Jones, A. A. S., Waitohi, Temuka	13
	Locker, W. S., Hororata (Line A)	12
	Lyon, C. R., Kakahu Rd., Temuka	19
	Lyon, W. J., Kakahu Road, Temuka (Line A)	27
	Lyon, W. J., Kakahu Road, Temuka (Line B)	21
	Milne, R., Culverden	18
	O'Connell, M., Totara Valley, Pleasant Pt. (Line A)	15
	O'Connell, M., Totara Valley, Pleasant Pt. (Line B)	15
	O'Connell, M., Totara Valley, Pleasant Pt. (Line C)	15
	Pascoe, A., Alyesbury, R.D.	50
	Pascoe, L., Aylesbury, R.D. (Line A)	50
	Sides, F. R., Lauriston	50
	Thomson, J. S., Kirwee (Line A)	17
	Thomson, J. S., Kirwee (Line B)	15
	Timblick, A. B., Hilton R.D., Temuka	25
	White, G. T., Waiau	37
Hunters II.	Barnett, R., Dunsandel	17
	Benny Bros., Springston R.D.	31
	Bisdee, J. C., Temuka R.D.	20
	Canterbury Agricultural Coll., Lincoln	26
	Clarke, F. R., Levels, Tycho R.D.	24
	Collett Bros., Opihi, Pleasant Pt.	28
	France, D. M., Levels, Tycho R.D. (Line B)	7
	Hoban, W. J., Culverden (Line A)	22
	Hoban, W. J., Culverden (Line B)	21
	Reynolds, H., 334 Sawyers Arms Road Papanui	8
	Roberts, R. H., Pleasant Pt.	19
	Thomas, J. H., Greenpark (Line A)	7
	Thomas, J. H., Greenpark (Line B)	7
College Hunters	Canterbury Agri. College, Lincoln	8
	Franks, L. J., 88 Russley Road, Fendalton	8
	Johnston, W. J., Springston R.D.	5
	Meyer, E. H., c/o. P.O. Timaru (Line A)	5
	Meyer, E. H., c/o. P.O. Timaru (Line B)	5
	Ryan's Est., Springston R.D.	18
	Spencer, E., Russley Road, Upper Fendalton	5
	Winchester, W. H., Lakeside-Leeston	7
Marquis	Frizzell, G., Swannanoa	63
	Galletly, G. E., Hawarden	18
	Matthews, W., Oxford R.D.	34
	Miles, O., Hawarden (Line A)	33
	Miles, O., Hawarden (Line B)	7
	Wright, W. L., Hawarden	52
	Wyllie, A. D., Omihi	18½
	Wyllie, J. J., Omihi	10
Tainui	Brown, L. N., Cooper's Creek, Geraldine	17
	Canterbury Agric. College, Lincoln	25
	Coe, R. B., Irwell, R.D.	20
	Coughlan, M., Kingsdown R.D., Timaru	14
	Crombie, Bros., Pleasant Pt.	12
	Milliken, H. M., Temuka	6½
	Patterson, N. G., Upper Waitohi, Temuka	5
	Wright, E. G., Dunsandel	10
Dreadnought	Canterbury Agric. College, Lincoln	9
	Talbot, P. R., Claremont R.D., Timaru	20

Appointment of Assistant to Director Of Fields Division

THE appointment is announced of Mr. C. H. Schwass, Divisional Executive Officer of the Fields Division, to the position of Assistant to the Director of the Fields Division.

Mr. Schwass was born in Marton, and received his secondary education at the Marton District High School. In 1907, following his passing the Public Service Entrance Examination, he joined the staff of the Department of Agriculture in Wellington. In 1917 he was transferred to field duties and was successively stationed at Waipukurau, Wanganui, and Marton.

In 1923, when the Fields Division of the Department was inaugurated, he was transferred to Wellington as Divisional Clerk. He was closely associated with the establishment of the Plant Research Station at Palmerston North in 1928, and at that time was transferred to Palmerston North as Divisional Clerk in the Fields Division and Secretary of the Plant Research Station.

When the Plant Research Station was taken over by the Department of Scientific and Industrial Research in 1934 and the headquarters of the Fields Division were removed to Wellington, Mr. Schwass again transferred to Wellington in the position of Divisional Executive Officer, Fields Division. This positon he has held until his appointment to the position of Assistant to the Director of the Fields Division.

Mr. C. H. Schwass

[S. P. Andrew & Sons, photo.

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The Orchard and Vineyard

Contributed by the Horticulture Division

Orchard Notes

Harvesting the Apple and Pear Crop

THE peak of the apple and pear harvesting is almost at hand and some difficulty is usually experienced in dealing with the large quantities which have to be handled in a short period. This had applied in the past more particularly in the exporting districts, where definite closing dates for export have operated and growers have been concerned in completing as far as possible the harvesting of a variety by a certain date.

Under the conditions now applying, growers will be preparing greater quantities of fruit for local requirements, as export possibilities are still in doubt, and it is quite certain that very much reduced quantities will be shipped overseas. This will allow for greater latitude in the maturity for picking, as apart from the quantity of apples required for cool storage the remainder of the fruit could be harvested up to a tree-ripened stage. This should tend to spread the work and ease the position greatly, allowing the fruit to be harvested to better advantage. Fruit for cool storage, however, should be selected from the main picking, which should not be too delayed.

In the mid-season several varieties may require attention during the same period, so it becomes necessary to plan carefully a harvesting programme to gain the best results.

Order of Picking

From about mid-March the main picking of Jonathans should become general in Nelson and northern districts, possibly a little later in the south. It is usually necessary to break into the Jonathan harvest to relieve the Delicious, and from the first and main picking the bulk of the cool storage quantities of this variety might be selected, rather than be placed on the market immediately in competition with Jonathans.

Following the main picking of Delicious, Jonathans will be reaching a tree-ripened condition and should be dealt with before there is risk of dropping. A short period of ordinary storage may be required for a part of the Delicious crop to allow for a reasonable clearance of Jonathans from the market. Growers should, therefore, provide the best conditions possible for holding such fruit and any later varieties requiring short or longer storage according to variety.

Storage Conditions

Much fruit is normally held in growers' sheds, but often with indifferent results due to unsuitability of the storage used, and also to the fact that much of the fruit is not suitable for storage on account of stings, punctures, and other defects causing rots not only in the fruits so affected, but others in contact.

Fruit for storage should be graded and placed back into clean cases, preferably paper-lined. To delay the ripening process and to avoid wilting, a cool, well-ventilated place is required, but fruit should not be subjected to strong draughts and the air should be kept relatively humid. This may be done by occasionally spraying water on to stacks and shed walls, or hanging scrim curtains, kept moist by a drip arrangement, over doorways or other openings on the windward side of buildings to allow cool moist air to pass through the stacks.

Avoidance of Grader Marking

Fruit is often so seriously marked through contact with grit and dirt on moving parts of grading machines as to cause rejection or placing into a lower grade. This can be avoided by more frequent cleaning of the grading machine, especially when the more greasy varieties of apples are being handled, when daily cleanings are imperative.

The Washington variety of apple marks very readily and should not be put over a grader immediately after harvesting. The most desirable method of handling this variety is just to sort, and then to grade and rough size into two sizes shortly after harvesting, and eliminate all but sound fruit and then pack from a long bin when ready to market, thus depending on hand sizing and avoidance of marking.

Improvement in Get-up

It is always desirable that fruit should be marketed in strong and attractive packages and many growers to their advantage have taken a pride in this particular feature of their orcharding operations. Under the present marketing arrangement uniformity is required and all packages must be up to the required standard.

Weak timber likely to break should be discarded. Fruit cases should not be stacked in the open to become weather stained and warped, but kept clean and under cover if possible. Labels require to be pasted on firmly and branding done legibly and neatly.

Filling the Orchard Gaps

Although it is not likely that much new planting will be attempted at present, except perhaps in stone fruit, re-

placements and filling the gaps should be attended to in order to maintain orchards at a good level of production and thus keep down costs. Now is the time to work out requirements and place orders for trees. Any new area to be planted should be broken up as early in the autumn as possible to give the land as long a period of weathering as possible before planting.

—N. J. ADAMSON, District Supervisor, Nelson.

Citrus Notes

Autumn Manurial Programme

WITH the approach of autumn, citrus growers will be considering the manurial programme. In the first place the green manuring cover crop should receive attention as advised in last month's notes. The application of chemical manures around the citrus trees should be confined to those which will tend to induce slow growth rather than soft and sappy growth. The latter takes time to harden and is very susceptible to frost injury. Having in mind the severe frosts experienced last year, citriculturists will realise the necessity to reduce sappy growth to a minimum.

The standard manures generally applied are blood and bone and fish manure. These can be recommended as both are rich in available phosphorus and also have nitrogen in a slow acting form available to plants.

It is stated that fish manure improves after storage for a month or two. The quantity to be applied will vary with the age of the tree and crop it can carry, but a graduated scale of applications should range from 2lb for the non-bearing tree, 5lb for the tree of from 5 to 10 years of age, and 10lb per bearing tree. As with other forms of horticulture, manuring should be closely related to the quantity which the tree can absorb.

Testing Manures

If a grower contemplates testing one manure against another he must be sure he commences on an even basis, i.e., that the trees under trial were capable of bearing equal crops and that normal annual variations have not unduly upset the crop. Too often a grower applies a certain manure and obtains good results which were due more to the general season than to the particular manure. There is considerable scope in each citrus district for testing the best manures to apply and the time and quantity to apply. Do not, however, expect the manurial programme to make up for other deficiencies in the citrus orchard. General tree attention, plus an adequate manurial programme, is of greater value than manure alone.

Frost Pockets

Do not prune trees now as this will have the same effect as forcing manures. At the same time consideration must be given to the liability of frost pockets. Where warranted the advisability of frost prevention should be considered, and the necessary equipment installed. In many cases the liability to frost injury may be minimised by cutting gaps in shelter belts in such a manner as will allow air to circulate rather than to settle in these frost pockets.

An autumn application of Bordeaux 3-4-50 should be made during April in order to protect young lemon fruits from citrus verrucosis and all types of citrus from brown rot, *pythiacystis citropthora*. In addition, in orchards where brown rot has occurred, prune the lower branches 2 feet from ground level and either stir the soil continuously, which is difficult during the winter months, or preferably sow a cover crop over the area under the trees so as to prevent the spores of brown rot being splashed by rain on to the citrus trees.

Picking of Lemons

Dark green fruit will be common on lemon trees at this season of the year. These should be allowed to become a lighter green if being forwarded for the marketable grades or become light yellow if grown for peel purposes. Avoid picking this dark green fruit during or just after rain as it is very liable to *oleocellosis* or "oil spot" which lowers the grade of such fruit.

If tree replacements are required for the coming season or a young orchard is to be planted, trees should be ordered now. Be sure trees are from good budwood, on the most suitable rootstock for the locality, have a good trunk, are budded at least 4 inches from ground level, and are strong-growing trees. The future of the orchard depends largely upon the quality of the trees chosen.

—A. M. W. GREIG, Citriculturist, Auckland.

Cool Storage Notes

Avoiding Deterioration of Fruit

TEMPERATURE is an important factor on apples and pears held in cool storage. Some varieties of apples, such as Jonathan, Sturmer, and Brighton, will not stand prolonged exposure to temperatures below 36 deg. F. without developing some form of internal breakdown. The length of the cool storage life of these varieties and the percentage of breakdown are affected by the cool storage temperatures and also pre-cool storage conditions during the growth of the fruit in the orchard.

Much of the deterioration of fruit in storage may be avoided by a study of

local soil and seasonal conditions, as these in turn affect the fruit while it is being held in cool storage.

Other Factors

There are other important factors which must be fully taken into account if the best results are to be obtained when holding fruit in cool storage:—

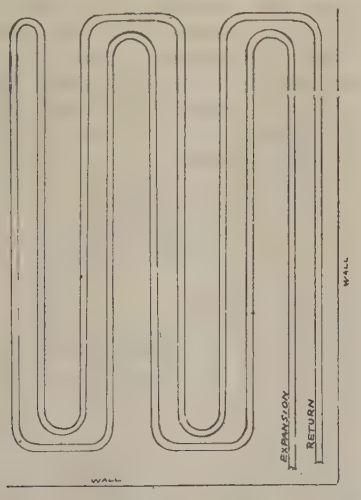
(1) Care in picking and handling; fruit to be held in cool storage should be free from bruising and blemish.

(2) The state of maturity of the fruit when it is picked and placed in cool storage.

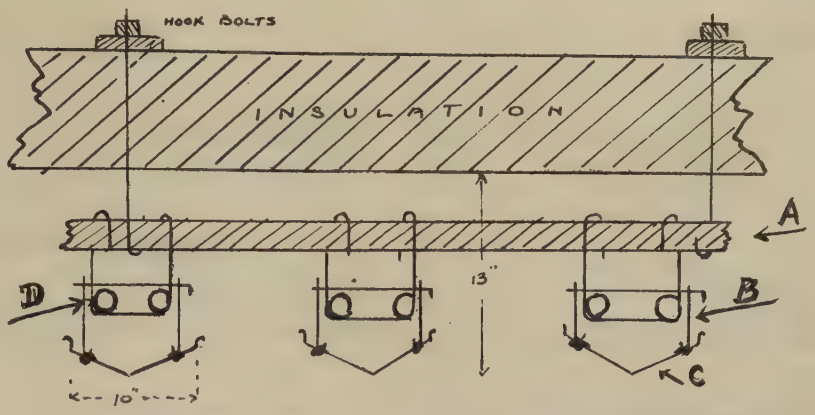
(3) To be held successfully for long storage, fruit should be well grown, matured, of good appearance and quality, in order to warrant the expense incurred by long holding.

(4) Methods that are known to give improved results with some varieties of apples and pears in storage should be applied, such as delayed storage and the use of oil wraps for Granny Smith and Ballarat varieties of apple.

(5) All varieties of pears should be well grown when picked, and, with the exception of P. Barry, immediately placed in cool storage and held at temperatures ranging from 30 deg. to 33 deg. F. Because of the tendency of P. Barry pears to drop before they are mature, this variety should be held in a cool orchard shed until they have reached a state of maturity that will minimise wilting while they are being held in cool storage. The Winter Cole variety should be wrapped in copper



Layout of expansion coils in flat ceiling formation. One circuit is shown, but not necessarily the correct number of runs in the circuit



A, 1¼in. ammonia pipe; B, pin and brackets to suspend drip trays; C, drip trays, made from 12in. of 18in. gauge flat galvanised iron; D, ammonia coil.

sulphate wraps to check the spread of grey mould by contact with affected fruits.

These factors affect the evaporation of water vapour from the surface of the fruit and its consequent wilting or shrivelling, as the greater the air movement the drier the air.

The use of forced air circulation has not shown to be otherwise beneficial than as a means to facilitate the transference of heat. Forced air circulation accelerates the wilting of fruit. Some varieties are more susceptible than others, as the thickness of the skin and

Tobacco Notes on page 237

the number and size of the breathing pores or lenticels have an influence on the physiological condition of the fruit during its growth, and also when it is being held under different temperature and humidity conditions in cool storage.

The relative humidity of 85 to 90 deg. is beneficial for the holding of apples and pears in cool storage, as the bright appearance and quality of these fruits are maintained after a long period when held in cool chambers at the correct temperature for the variety and at a relative humidity of from 85 to 90 deg. These conditions are made possible by the installation of direct expansion ceiling coils and drip trays, thus relying on convectional air movement for the transference of heat.

When installing this direct expansion system of cooling pipes and drip trays, there are a number of features which must be considered when the store is being erected and the system is being installed. These are:—

(1) Height of the ceiling of the cool chamber.

(2) Type of ammonia coil which will improve the distribution of the cooling; also defrosting appliances for pipes and drip trays.

(3) Clearance between the ceiling of the chamber and the ammonia pipe.

4) Clearance between the drip tray and the ammonia pipe to avoid condensation on the drip tray.

(5) Distance between the drip trays to facilitate air movement.

(6) Length of ammonia piping in each coil circuit and in each chamber.

Ventilation

Air circulation is necessary for ventilating purposes only when this cannot be accomplished by the opening of the cool chamber door. When cool chambers have a passage down the centre, a door at one end of the passage, and the fruit cases have been stacked in such a manner to allow ample uninterrupted vertical spaces from floor to ceiling, the ventilation of the fruit-cooling chamber becomes quite a simple matter, and is accomplished by leaving the chamber door open from 10 to 15 minutes twice weekly when the outside atmosphere is cold (preferably early on cold mornings).

When using an air circulating fan for ventilating purposes, the fan should be used to expel the air from the cool chamber, as when warm air is forced into a cool chamber it will deposit its moisture on the cool surfaces on entering the chamber.

—A. POWELL, Cool Storage Officer, Wellington.

The Home Garden

Small Fruits and Flowers

Vegetables

Cultivation of the Ground

F. SYDENHAM, Assistant Horticulturist, Wellington.

AT this season of the year, with many crops taken from the ground and used or stored for winter use, there is much of the ground free of crops. An excellent opportunity is offered to cultivate the ground thoroughly and to incorporate farm manure or compost with the soil. Heavy ground is difficult to dig when it is too dry, as it is almost impossible to break up the clods. At a later period after the wet weather has set in it is almost impossible, again, to dig because it is too wet and sticky.

There is a stage with heavy soils when digging is relatively easy, and that stage obtains when it has received a certain amount of wetting from autumn rain. Loamy and sandy soils do not present such difficulty, and most soils of these classes can be dug a short time after rain. With these light soils it is generally advisable to defer digging until early in the spring. In the meantime the surface of the ground should be cleared and a cover crop planted. This can then be dug under three to six weeks before the land is required again for planting.

Type of Cultivation

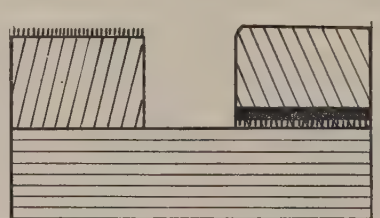
The actual type of cultivation to be done depends upon the condition of the soil and the previous treatment it has received. Deep cultivation need be done only once in three or four years on most soils; on the other occasions the soil is turned to the depth of the spade.

There are four main types of cultivation which may be employed. If the details, such as cleaning out the loose soil from the bottom of the trench and trimming the weeds from the ground that is next to be turned over, are carefully followed no weeds will be left on the surface of the ground, and, in addition to the ground being more efficiently cultivated, it will present a much tidier appearance.

A brief account of these methods is given. In the illustrations which accompany this account the subsoil is represented by horizontal lines and the topsoil by lines approaching the vertical. Weeds are shown as short vertical lines, and manure by a black block.

Digging

By this method of cultivation, soil to the depth of one cut with the spade is turned over. First, remove the



growth of weeds and throw them over the ground that is to be dug. Prepare a trench by removing soil the width of and to the depth of the spade, and move this soil to a point where the digging will be completed. Clean up the bottom of the trench of loose soil, and it is ready for the work to begin.

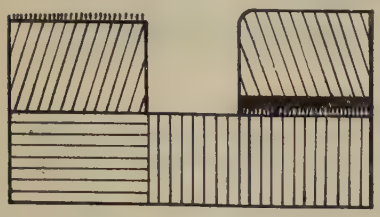
The next process is to chip off about one inch of soil approximately the width of the spit to be taken and containing the weeds, and to turn it and place it on the bottom of the trench. Compost or farm manure may be added at this stage and chopped up with the spade. After this, a spit is cut with the spade and the spade is pushed vertically into the soil, the spit lifted, turned, and placed on the weeds or manure in the trench. This is repeated until the original trench is filled.

The final process is to clean out the loose material from the bottom of the trench and to place it on to that already turned up. These operations are repeated until the whole area is dug. The final trench is filled from the material of the first trench. If each spit is cut several times after setting it in place the soil will show a much more even appearance after the digging has been completed.

Double Digging

This method, which is also known as "bastard trenching," is similar to the former method, except that the subsoil in the bottom of the trench is turned over to the depth of the spade and left in the bottom of the trench. After this, the weeds are chipped from the surface of the ground and inverted on this dug second spit, and the digging continued.

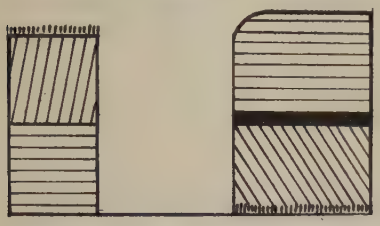
This method of cultivation is useful where the soil is shallow and the subsoil not good enough to support plant



life. After several years of this cultivation, however, this lower level of the soil improves in condition. When it will support growth it may be brought to the surface.

Trenching

Soil cultivation by this means is useful only on soils that are deep and fertile, and where the layers of subsoil have already undergone improvement or are capable of growing good

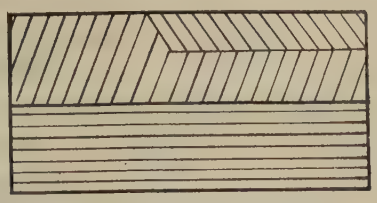


plants. A trench two to three feet wide and two or three spits deep is made and the material wheeled to the other end of the area that is to be trenched. The depth of the trench depends on the depth of the good soil. The loose material at the bottom of the trench is also removed.

The space for the second trench is then marked off, and weeds from the surface inch placed in the bottom of the trench. Thereafter, one spit deep of the soil is taken and inverted on to the weeds. This is followed by the second spit, and so on, if more than two spits are taken. The trench is finally completed when the loose soil is thrown up on to that already turned up. A layer of farm manure may be placed between any of the spits of soil. The surface should be left rough so that the weather may purify and sweeten it.

Pointing

This type of digging is useful where the ground has already been dug and the surface requires loosening before the final preparation at the time of sowing. Pointing consists in pushing the spade, which is held at the



angle of 45 degrees, into the soil, lifting the soil and inverting it in the hole from whence it came. About four inches of the soil are then turned over.

Harvesting, Curing and Storing Kumaras.

THE kumara crop should be thoroughly matured before being dug. It is advisable to allow the crop to grow as long as possible into the autumn. It must, however, be lifted before frosts appear, as the tops are tender and, when frosted, they decay rapidly, and the decay soon extends to the roots. Should the tops be frosted, they should be removed and dug as soon as possible.

Great care should be exercised in digging, as kumaras bruise very readily when freshly lifted and, when bruised do not keep well. They then require seven to ten days' curing, which may be most satisfactorily accomplished in the warmer districts, where most kumaras are grown, by gathering them into small heaps exposed to the drying action of the sun and air during the day, but covered by their vines or sacks at night to keep them dry.

After this curing period the roots are fit for storing. The condition of the store should be warm and dry. Ventilation should be allowed on dry days to remove the gases that are produced. The most suitable temperature for storage is 55 degrees Fahrenheit. A dry shed or basement is useful for storing small quantities. In these structures the kumaras keep best if embedded in dry sawdust or sand. If stored in sacks they are inclined to wither. In larger quantities they are most conveniently stored on a bedding of dry bracken fern or straw in closed pits in well-drained land.

Seasonal Don'ts

Don't

leave any ground lying idle. It is not improving except if it is heavy and is left dug so that frosts might mellow it. When a crop is taken out and another is not to be planted immediately a green cover may be sown. It may be blue lupins, Italian ryegrass, oats or the quick-growing mustard. Even if the ground is required again before the crop has made maximum growth the material that is dug under will replenish some, at least, of the humus that has been used up. In addition to supplying humus, the cover crop, through its dense growth, smothers weeds and saves the trouble of weeding. The cover crop should receive a light dressing of superphosphate at the time of sowing.

Don't

forget to label home-saved seed and to indicate clearly on the container the year of the saving of the seed. Nothing is more disappointing than to plant a quantity of seed and to find that nothing comes up. The reason may be that the seed has lost its viability through being kept too long. Also, it is most disappointing to plant a line of seed only to find that some unexpected plant comes up. Some seeds are very similar in appearance, and may tax the experience of an expert in differentiating them. Both these annoyances can be avoided if home-saved seed is properly labelled as to variety and date of harvest.

Random Notes

Harvesting of Walnuts

BEFORE the nuts fall, the grass under the walnut trees should be scythed or grazed off, so that few or none of the nuts will be lost in the grass or crushed by the pickers. As the nuts mature and begin to fall, the trees should be shaken to dislodge as many as possible. Long poles may be used, or an active person may climb the trees and shake the outside limbs.

The nuts should then be picked up as soon as possible. Even a short exposure to dew and rain causes a staining of the shells and a consequent spoiling of appearance, and the quality of the nut also suffers. During picking they should be roughly cleaned of their husks, and should then be dried off thoroughly. This may be accomplished by spreading them to a depth of no more than six inches on a wooden or concrete floor in a dry and well-ventilated shed. They should be stirred from time to time so that they dry evenly.

If the curing is done outside, shallow trays with slatted bottoms may be used. Here, again, the nuts may be placed to a depth not exceeding six inches, and stirred frequently. The trays should be stacked overnight and covered so that they keep dry.

After the drying is complete the small nuts, fragments, and pieces of fibre should be riddled from the bulk and the nuts placed in bags. The open mesh type of bag will be found most suitable, as it allows the free passage of air through the bags. When the nuts are harvested promptly as they fall and are cured as suggested, a good bright sample should be obtained.

Those who grow walnuts commercially—and private growers who grow more than sufficient for their home use—should find a very ready market for properly harvested and cured nuts this season.

The Flower Garden

Clearing Away Summer Annuals

SEASONAL work in the flower garden consists in clearing away the summer annuals as their blooming period passes. The ground should then be thoroughly prepared in readiness for further planting of wallflowers, stocks, pansies, polyanthus, Iceland poppies, etc.; hyacinths, daffodils, tulips, etc.; anemones, ranunculus, irises, and herbaceous perennials.

Borders of herbaceous perennials should be cleared up, dug over, and manured, and any planting necessary done before the wet weather prevents these operations from being carried out.

This season offers a suitable time for breaking up and replanting clumps of perennials which, if left without this attention, become root-bound and produce poor growth and inferior blooms.

Lawns

Care of Established Lawns

THIS season also offers an opportunity for attending to lawns. Last month notes were given on the laying down of a new lawn. The following is an account of the autumn management of an established lawn.

The lawn will remain in pleasing condition only as long as it is well managed. Attention at this time of the year must be paid to returfing, or loosening and reseeding patches that have been worn down to bare ground.

The whole lawn will be benefited if it is given a thorough raking to drag out any matted material, clover, and weeds, and to lift up any flat

Continued on page 230.

What To Do in the Vegetable Garden This Month

Summary of operations for the month (until the middle of April).

SEEDS TO SOW.

Sow onion seed to produce plants for transplanting in the spring. In cool districts make this sowing late in March, and in warmer districts early in April, but not later than the middle of April.

Make a small, late sowing of short horn carrots for use in late spring.

SEEDLINGS TO TRANSPLANT

Transplant cabbage, cauliflower and silver beet seedlings for spring cutting.

PERENNIAL CROPS.

As soon as the growth on asparagus plantations shows a yellow colouration it should be cut. If seed is present, the material should be removed and burnt.

Break up chives and replant them in new and rich soil.

In warm districts, perennial herbs may be broken up and replanted, or cuttings taken.

SPECIAL NOTES FOR WARM DISTRICTS.

Sow spring salad onions about the end of March. White Lisbon is a suitable variety.

Sow lettuce seeds in a warm situation.

SPECIAL NOTES FOR COLD DISTRICTS.

Sow spring salad onions about the middle of March.

Sow lettuce seeds in a frame.

CROPS TO HARVEST.

Pull main-crop carrots, as, if left in the ground, they deteriorate. This does not apply to parsnips and autumn-sown carrots.

Harvest marrows before they ripen—when they reach the desired size. Pumpkins, however, should not be harvested until they are thoroughly ripe, but should be harvested before they are frosted. Allow them several days in the field after cutting so that they may harden.

Dig main-crop potatoes as soon as mature in warm, humid districts where re-growth is likely to arise from the tubers. In cold districts they may be left in the ground for several months, if necessary.

Harvest main-crop onions as the tops fall and turn yellow.

Dig kumaras where there is a likelihood of early frosts. It is advisable, however, in districts where frosts do not occur as early as this to delay digging so that growth may be completed.

GENERAL WORK.

Earth up celery and leeks. Celeriac does not require such treatment.

Clean up and bury any rubbish and so eliminate unnecessary places where slugs, snails and slaters can find shelter.

Pay strict attention to the control of weeds which, while small and easily destroyed, will make rapid growth with favourable conditions of temperature and moisture.

Clean up any ground from which a crop has been taken. Burn potato haulms, tomato vines and cabbage and cauliflower stumps, but dig under anything else. If the ground is heavy, leave the surface rough after digging and exposed to the action of the weather. Light soil and that which is easily worked and does not require mellowing by the weather is best sown down to a cover crop for the winter if not required for cropping.

APIARY NOTES

Contributed by Officers of the Horticulture Division

Preventing Robbing by Bees

AS we are now in the autumn period, the main honey flow will have ceased and been harvested. In favourable localities, given suitable weather conditions, there may be still a "flow" from late-flowering trees, such as gums, and in some districts quite a large amount is sometimes gathered from penny royal. This class of honey has a strong minty aroma, and is not at all suitable as a table honey. It is, however, a valuable asset to the colonies of bees for winter stores. Beginners who may be extracting late would be well advised to take precautions to prevent any penny royal honey being mixed with the clover yield. It takes a very small quantity to depreciate the value of the good clover honey.

It is not difficult to detect frames containing the penny royal, for, if held up to the light before attempting to uncap the cells, it will be noticed that it shows up much darker in colour than a comb of clover honey. When noticed, such frames should be set aside for winter feed for the bees, and all the white honey extracted. Some years there is a fairly large surplus of this lower grade honey—much more than is required by the bees to last them into the spring months—so that unless some outlet can be found for it in the way of selling the frames to other bee-keepers for stores it will have to be extracted in order to avoid contaminating next season's crop.

The next difficulty is to dispose of it. It would be useless to attempt to export it or to expect the Internal Marketing Division to accept a strong flavoured penny royal honey; therefore, some other outlet must be found to dispose of it. It may be possible to sell it for vinegar-making, or to manufacturers who use honey. If no other outlet can be found, it should be stored in air-tight 60lb. tins and kept for a lean year to winter the bees.

Prevent Bees Robbing

Bee-keepers will need to take special precautions against allowing the bees to start robbing. As a general rule there is little danger of this occurring up to the end of January.

To assist in avoiding this trouble of robbing the entrances should not be made too wide. When bees are busy gathering nectar in abundance they will make no attempt to rob—in fact, honey can then be left alongside the hives and they will not molest it—but in a season when there is a scarcity of nectar they will take every advantage to secure honey or sweet substance from any source.

Robbing is very easily started, and, once started, it is extremely difficult to control, so that prevention is better than cure. Do not keep the hives open any longer than can be avoided, and when taking off any surplus that may be available, be careful to keep such honey well covered until it reaches the honey house, where, if this is bee-proof, it will be safe. Avoid taking any bees into the extracting room, for, even if it is fitted up with bee escapes, these bees when they fly home will return bringing others with them, and they will frequent the door seeking every chance to gain admittance.

When they are in a robbing mood the bees also become very vicious, and will fight at every opportunity. If it is found they cannot be controlled, the best plan would be to take off the honey as quickly as possible and do the extracting at night. The wet combs, after being extracted, should also be left until the bees have quietened down before putting them on the hives to be cleaned up. Nothing excites the bees more during a shortage of nectar than putting out "wet" combs during the daytime.

Vicious Bees

Beginners are sometimes very disappointed and discouraged, when they find their bees which were so quiet and docile in the spring and early summer suddenly become vicious and difficult to control. The reason for this is that just after the honey season there are large numbers of field bees and not sufficient nectar available to keep them occupied. They then fly around looking for any unprotected hives to rob or for any sweet substance. Failure to find this appears to upset their temper, and at such times the least sign of intereference will cause them to sting.

After a week or two these bees die off, and the younger generation, which has not been disappointed in the stoppage of the honey flow, is not so disposed to sting. Experience has shown that it is often much easier to examine the hives during April to July than during February and March.

Inexperienced bee-keepers often mistake the early flights of young bees in front of the hives for robber bees. If a hive is being robbed by other bees it will be found that a number of bees will be fighting at the entrance while others will be flying around attempting to gain admission. When a robber bee is coming out of the hive with a load of stolen honey it climbs up the front of the hive to get a good "take-off" with its load. Empty bees belonging to the hive usually fly straight off from the alighting board.

Locating the Robber Hives

It often occurs that only one hive in the apiary starts the robbing, and if

the closing down of the robbed hive is not effective in stopping the nuisance it may be necessary to find the home of the robbers. To do this, a simple method is to take a handful of flour and dust it over the emerging robbers. Then observe the incoming bees at the other hives.

It will then not be difficult to detect the flour-coated bees returning to their own homes with the stolen sweets. It has been found that, if the robbed hive is then placed on the robber hive stand and the robbers put in its place, the changing over seems to disorganise them so much that the trouble will cease.

Replacing Old Queens

Bee-keepers who are intending to requeen their colonies should not delay in obtaining the young queens. It is well known among experienced bee-keepers that colonies with a young laying queen will winter much better and come out in the spring in better condition than those headed by an old queen.

Marketing the Crop

Those who have recently started bee-keeping and who have a surplus of honey—more than they require for their own use—would be well advised to forward their honey to the Internal Marketing Division, which make a cash advance on all honey as soon as it is graded. Those intending to do so should communicate immediately with the Internal Marketing Division, as the time for acceptance of honey is limited.

—G. V. WESTBROOKE, Apiary Instructor, Hastings.

THE HOME GARDEN——Continued from page 228

weeds that may be present. It should then receive a topdressing of a complete manure. A suitable mixture consists of 6 parts sulphate of ammonia, 3 parts superphosphate, 1 part sulphate of iron, 1 to 2 parts sulphate of potash, and 6 parts dried blood. This is applied at the rate of 2 to 3 oz. per sq. yd. (5 to 7½ cwt. per acre). Such an application should be distributed evenly, and may, to the benefit of the lawn, be repeated in the spring.

All swards, whether they be agricultural or horticultural, require phosphatic dressings, but too liberal a dressing of phosphate on lawns, without the inclusion of sulphate of ammonia and under the conditions of frequent and close cutting, favours the development of weeds and clovers, which are not desirable in a good lawn. It is to control these that sulphate of ammonia and sulphate of iron are included in the mixture.

Repairing Open Patches

If there are open patches in the lawn, a small quantity of seed may be sown after raking the lawn, after which a topdressing of rich, weed-free soil or rotten leaf mould, screened to remove lumps and coarse particles, should be distributed over the lawn. This may be very evenly distributed and the surface left perfectly even if a light straight-edge board 6 to 8 ft. long is used to distribute the dressing. Only that which escapes under the board is left on the lawn and the remainder is carried forward and distributed where required.

By moving this board backwards and forwards briskly after the dressing has been laid, a perfectly even surface is obtained and the soil worked in round the plants. It is generally possible to mow again after a good shower of rain.

Treatment of A Weedy Lawn

When a lawn is very weedy it can generally be improved and the weeds reduced by treating it as suggested above; but instead of mowing it at frequent intervals, allow it to grow and to continue doing so as long as it can be mowed by the mower. This may be repeated several times, and not until well into the spring should the lawn be closely cut again. Such treatment as this quickly chokes out weeds, and the manure and development of grass strengthens the sward. Generally, it is only on unmanured lawns that weeds appear. Moss appearing on the lawn is a definite sign of starvation, and is controlled by the application of a complete manure.

Lawn Pests

The grass grub (*Odontria*) is possibly one of the most serious lawn pests. Eggs are laid in November and December by the adult bronze beetle, and by February, if the attack is severe, the turf becomes spongy and weak in patches. By April or May the damage reaches its maximum, when patches in the turf may be killed outright. The grubs then burrow to lower levels for the winter, reappearing again at the surface in August. Spring damage, however, is small compared with autumn damage.

There are control measures for the grass grub by using chemicals, but control by this means is tedious and expensive. Good lawn management and the production of a strong turf by correct manuring and watering during the dry season, while not controlling an attack, will minimise the damage, and the lawn will quickly recover late in the autumn.

The same applies to attacks by the subterranean grass caterpillar (*Porina*) although, as they are surface feeders and come to the surface only at night, they can be poisoned by spraying with arsenate of lead at the rate of 3 lb. per 100 gallons of water.

When earthworms are prevalent (as occurs in neutral and alkaline soils) and it is desired to reduce their numbers, copper sulphate is the most effective poison. It should be used in a finely-powdered condition, and sieved to remove lumps. Then, if mixed with twice its weight of dry sand, it may be evenly distributed. A dressing of 1 oz. of this mixture per sq. yd. will be sufficient, and should be broadcast during rainy weather and washed into the soil, using the hose.

Copper sulphate damages foliage, and unless all is quickly washed from the leaves the sward will be damaged. Where the soils are made acid by the use of sulphate of ammonia and sulphate of iron, the disfigurement of the lawn by worm casts is negligible, as worms do not tolerate acid conditions.

Notes for the Poultry Farmer

Contributed by Officers of the Livestock Division

Management of Breeding Hens

THE bulk of the routine work of selection for breeding purposes for the ensuing breeding season will, or should be, completed by the end of March. The birds which have been set aside for this purpose should be marked by leg bands, for preference, in order that no mistakes may occur, and also that one may know the particular age of the stock which from year to year may be in use as breeding stock.

In the writer's opinion, the ring used for ringing pigs (that is, the flat ring, large size, with the points cut off) provides a cheap and very efficient method of ringing stock for identification purposes.

The choicest specimens of hens, if allowed to continue laying, will in many cases still be in profit. An effort should be made to encourage such stock to take a rest from egg production with a view to their moulting and thus securing a timely rest before entering a further season of production and before their eggs are required for incubation purposes. If good stock are to be expected from these eggs, a good rest is essential to the bird in order that its full strength may be available for transmission to the egg.

Feeding

It is somewhat difficult at times to procure a moult, but generally the desired moult will be secured if the feed ration is widened by the addition of more bran to the mash and very little animal food is given, together with ample supplies of green material and a change of quarters (free range if possible).

It is wise to pay more than ordinary attention to the feeding. In many cases where poor results were secured from incubation, particularly in the early period of the breeding season, investigation frequently disclosed that it was due to the fact that the birds were allowed to become overfat and were therefore not in a fit condition for the breeding pen.

In the feeding of breeding stock it is a good practice, in the majority of cases, to feed ½ bran to ½ pollard by measure, with the addition of say 5 to 7 per cent. animal food in the mash, at the same time paying attention to the feeding of a fairly light grain ration. The addition of good quality oats, say in the proportion of 1 of oats to ½ part of wheat and ½ of maize, will, if fed in conjunction with the above mash ration, have the desired effect of keeping the breeding stock in good fettle.

To be in good breeding trim a bird needs to be in good condition without any suggestion of being overfat. Sufficient food should be given to maintain this condition, and this can be obtained by keeping the stock just on their toes for their food—in other words, keeping them slightly hungry rather than feeding them to the limit of their capacity.

Rest from Production

There is, of course, a great temptation to encourage the breeding stock back into profit as soon as possible, particularly in view of the fact that

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in the early period of the breeding season eggs are usually bringing good prices. It is most unwise, however, to encourage any practice which would prolong the egg cycle or unduly hasten the resumption of production.

Every breeding bird should be given from 10 to 12 weeks' rest from production in order that it may recuperate and be in a good condition to produce hatchable eggs.

It is only by looking ahead and studying every factor likely to exercise a beneficial influence or otherwise that one is able to get the best out of one's stock, and thus secure practical and profitable results. After all, it is that which one puts into one's efforts by thought and work which brings success and ensures progress.

Care of the Pullet

ESSENTIAL factors linked in the chain of management of poultry plants during late autumn and early winter are the care and attention given to the growing pullet.

It is on the production secured at this period, when egg prices are at a high level, that the success of the plant for the year largely depends. In order to secure this production—which must be considered as an out-of-season product, due to the fact that the natural laying season for hens is the spring and summer months—the details of management up to and through the production stage must be carefully and intelligently observed.

The producer should carefully note the development of the birds and plan his work so that they may have every opportunity of growing into good-bodied birds, fitted for profitable egg production, and the raising of sound breeding stock. These two factors can be considered keystones of the industry.

Time of Hatching

For profitable winter production the chicks, in the case of the heavier breeds, should be hatched during August and September, and the lighter breeds during September and early October. This is not to say that chicks hatched later than these periods may not, with good management, grow eventually into profitable stock, but in order to do so they require special care in management of feeding. The feed should be of good quality, as much as they will eat without waste, with plenty of fresh, succulent green feed. This latter provision is specially important in the raising of late hatched stock.

While pullets hatched in July and August cannot be depended on for the winter season production, due to the possibility of partial or neck moulting, they will prove of good service in assisting to maintain egg production during early autumn at a time when a material drop in production is experienced from the adult stock.

As early-hatched stock usually develops and grows bigger than the later-hatched stock, making good specimens for the breding pen, it is a wise course to have a few early-hatched batches.

Changes in Ration

Young stock, particularly early-hatched birds, are very susceptible to changes in feeding and quarters, and care should be taken to see that they are penned in permanent quarters before production begins. Every care should then be taken to see that no change is made in the food ration or, if this must be done, that the change is very gradual. Should the birds give evidence of maturing too quickly, the feed ration should be amended by reducing the animal content.

As a result of careful selection of breeding stock over a period of years the average egg production has undoubtedly increased, but with increased fecundity in our laying stock there has possibly been an increase in mortality due to ovarian troubles. Much of this mortality could be avoided if the causes of the trouble were better understood and more care taken in management.

In the case of breeding pullets it is a question whether it is not more desirable to allow them to come into production without the adoption of over-forcing methods and foods calculated to stimulate egg production, in order that the producing stage may be gradual and not favourable to over-strain of the egg-producing organs. Once the birds settle down to regular laying, the animal ration may be increased accordingly. It has been noted that on poultry farms where the quality of the stock has been consistently good, quite a considerable number of the best of the pullets are annually lost through ovary troubles or vent-picking, due in some measure to over-forcing through feeding too liberal an allowance of milk and meat-meal just before the expelling of the first egg and during the early production stages.

Nesting Arrangements

The lack of suitable nesting arrangements where the pullet would have the opportunity to educate herself as to the whereabouts of nesting quarters before beginning to lay is closely allied to vent-picking and cannibalism among young pullets in the laying flock. On many plants the cost of suitable nesting would be repaid in one season if consideration were given to the mortality indirectly due to deficiencies in this direction, and an effort made to install nests providing seclusion and room for two birds in one compartment to avoid egg breakage.

With the young pullet entering production, the question of providing laying space is generally a source of anxiety, due to the fact that the adult stock are still in production, although gradually falling away. Where capital is lacking to provide spare houses solely for pullets, it is better to raise fewer young birds and to give them every facility rather than to crowd them and thus subject them to the troubles associated with overcrowding. Overcrowding and lack of ventilation are largely responsible for many troubles in young stock, and it should be borne in mind that a pullet well reared is worth two or three birds reared under unfavourable conditions.

Health of Stock

With more intense production, it is important that conditions be made favourable to the health of stock. Following overcrowding comes decreased vitality, and trouble may then be expected.

When houses are stocked to capacity —and in some cases over-full—free ventilation is important if trouble is to be avoided. On too many plants little attempt is made to see that the air within the house is fresh; consequently, the house becomes damp, due in part to moisture exhaled by the birds, and in a condition conducive to the spread of colds and other troubles.

If for no other reason than the avoidance of troubles such as coccidia, every effort should be made to keep the house dry and sanitary. It is when the budding pullet is nearing the productive stage that many losses are experienced from this disease. These losses can be minimised, if not entirely eliminated, by strict attention to sanitary conditions.

N.Z. Federation of Young Farmers' Clubs

Edited by S. Freeman, Dominion Organizing Secretary

Visit of West Australian Junior Farmers' Club Members

BEFORE the outbreak of war the Federation extended invitations to Young Farmers' Clubs and similar organisations throughout the Empire to send representatives to New Zealand to be the guests of the New Zealand Young Farmers' organisation for about six weeks during the Centennial celebrations. The invitation was sent to organisations in the United Kingdom, Canada, South Africa, New South Wales, Victoria, South Australia, and Western Australia, and it was anticipated that a party of between 20 or 30 overseas visitors would avail themselves of the invitation.

With the outbreak of war, however, the various organisations concerned regretfully declined, with the exception of the Western Australian organisation, which body accepted, sending only two members, instead of the four included in the invitation. The two visitors, Messrs. A. H. Chappel and P. Marshall, both members of the Lake Grace Junior Farmers' Club, Perth, arrived in Wellington by the Awatea on Friday, February 2, and after spending a few days sight-seeing and visiting the Centennial Exhibition, set off on a tour of the Dominion.

Because of the petrol restrictions it was necessary to send them from district to district by rail instead of relying on district committees, etc., for transport by car, as was originally intended. The Federation has been considerably assisted in this connection by the kindness of the Hon. Minister of Internal Affairs, who made railway passes available over both Islands for the period of the tour.

This has made it possible for the itinerary to be extended in order to give the visitors a more comprehensive idea of our Dominion's resources, and better opportunity for contact with members of our own organisation.

Billetting has been made available in most of the centres through the kindness and hospitality of club members and others interested. The itinerary arranged at the time of going to press is given below, although a few minor alterations will probably be necessary during the tour.

Itinerary

North Island.

February 2nd (Friday): Arrive Wellington per Awatea, 8 a.m. Day in Wellington.

3rd (Saturday): Wellington. Exhibition, etc.

4th (Sunday): Wellington. Sightseeing.

5th (Monday): Wellington. Leave 6.13 p.m. per railcar, arrive Masterton 9 p.m.

6th (Tuesday): Masterton. Visits, etc.

7th (Wednesday): Masterton. Leave 11.23 p.m. train, arrive Hastings 4.29 p.m.

8th (Thursday): Hastings. Visits, etc.

9th (Friday): Hastings. Leave 5 p.m. train, arrive Palmerston North 9.20 p.m.

10th (Saturday): Palmerston North. Massey College, etc.

11th (Sunday): Palmerston North. Sightseeing. Leave on Limited express 9.51 p.m.

12th (Monday): Arrive Auckland 9.30 a.m. Sightseeing, etc.

13th (Tuesday): Auckland. Fertiliser works, etc.

14th (Wednesday): Auckland. Leave 8.40 a.m. express, arrive Whangarei 2.15 p.m.

15th (Thursday): Whangarei. Visits, etc.

16th (Friday): Whangarei. Leave 11.38 a.m. express, arrive Auckland 5.29 p.m. Leave Auckland 7.15 p.m. express, arrive Frankton 9.29 p.m.

17th (Saturday): Frankton-Hamilton. Ruakura Farm. Leave Hamilton 1.40 p.m. express, arrive Rotorua 4.15 p.m.

18th (Sunday): Rotorua. Sight-seeing.

19th (Monday): Rotorua. Leave 1.20 p.m. bus, arrive Tauranga 3.40 p.m.

20th (Tuesday): Tauranga. Visits, etc.

21st (Wednesday): Tauranga. Leave 10.47 a.m. express; arrive Frankton 3.8 p.m. Leave Frankton 4 p.m. train, arrive Otorohanga 5.39 p.m.

22nd (Thursday): Otorohanga. Waitomo Caves, etc. Leave Otorohanga 11.28 p.m. express.

23rd (Friday): Arrive New Plymouth 7.19 a.m. Visits, etc.

24th (Saturday): New Plymouth. Visits, etc.

25th (Sunday): New Plymouth. Sightseeing.

26th (Monday): New Plymouth. Leave 8.25 a.m. express, arrive Hawera 10.9 a.m.

27th (Tuesday): Hawera. Visits, etc. Leave 10.14 a.m. express, arrive Wellington 6 p.m.

28th (Wednesday): Wellington. Free day. Leave per inter-Island steamer express 7.30 p.m.

South Island.

29th (Thursday): Arrive Christchurch. Leave 8.35 a.m. express, arrive Dunedin 4.18 p.m.

March 1 (Friday): Dunedin. Visits, etc.

2nd (Saturday): Queenstown. Sightseeing, etc.

4th (Monday): Queenstown. Sightseeing.

5th (Tuesday): Leave Queenstown 9.25 a.m. by service car for Invercargill, arriving 2.50 p.m.

6th (Wednesday): Invercargill. Visits, etc.

7th (Thursday): Leave Invercargill 7 a.m. express, arrive Oamaru 2.37 p.m.

8th (Friday): Oamaru. Leave 3 p.m. express, arrive Timaru 4.28 p.m.

9th (Saturday): Timaru. Visits, etc.

10th (Sunday): Timaru. Sightseeing, etc. Leave 5.47 p.m. Sunday excursion train, arrive Christchurch 8.53 p.m.

11th (Monday): Christchurch. Lincoln College, Wheat Research Institute, etc.

12th (Tuesday): Christchurch. Sightseeing.

13th (Wednesday): Christchurch. Leave 8.20 a.m. train to Parnassus; road motor to Blenheim, arrive 5.30 p.m.

14th (Thursday): Blenheim. Leave 4.30 p.m. service car, arrive Nelson 7.30 p.m.

15th (Friday): Nelson. Cawthron Institute, etc.

16th (Saturday): Nelson. Sight-seeing. Leave per steamer, 7 p.m.

17th (Sunday): Arrive Wellington 6 a.m. Free day.

18th (Monday): Wellington. Exhibition, etc.

19th (Tuesday) or 20th (Wednesday): Sail for Sydney per Awatea or Wanganella (exact date uncertain).

Wanganui Y.F.C. District Essay Competition

AN essay competition was recently held under the auspices of the Wanganui District Committee, the subject being "My Idea of the Young Farmers' Club Movement." Mr. Holgerson, of the staff of the Wanganui Technical College, acted as adjudicator. The competition was open to financial active members of clubs throughout the Wanganui district area, the essays not to exceed 1000 words, and to be the efforts of individual members and not teams. A prize of £1 1s was voted by the Wanganui District Committee.

Only four entries were received, the winning essay being submitted by C. B. Anderson, Bulls Club. Commenting on the entries, the judge stated that, on the whole, the essays were fairly even. In making the awards he allowed marks under the following headings:—Subject matter, (70 marks); style, (20 marks); general impression, (10 marks); the winning essay received the following marks under the various headings: 60, 16 and 8, a total of 84 out of a possible 100 marks.

In concluding his report the judge stated: "It is pleasing to note the wide influence of the Y.F.C. movement as evidenced by the field traversed by the competitors in this competition. I should like to express my pleasure at being able to assist the clubs in this small way, and trust that the awards will meet with the approval of your officers and the competitors."

The winning essay is published below.

"My Idea of the Y.F.C."

by

C. B. Anderson, Bulls Club.

TO my mind this wonderful organisation will be responsible for the greatest revitalising effect on our farming industry in New Zealand since the innovation of cool storage.

Since the establishment of that great milestone in the 'nineties, the rural areas—in fact, the whole of New Zealand—have rapidly leaped ahead, and I will venture to suggest that "progress" has, in many ways, outpaced many who hold a right to its virtue. Farming is essentially a business, but, in the main, has rarely been regarded as such. In this respect the Y.F.C. movement is out to achieve the greatest honours.

When the idea of forming a club was first mooted in my locality I found myself very much in ignorance, but nevertheless keenly interested. The attempt to form the club was being made by the local branch of the Farmers' Union and, determined to become at least enlightened, I presented myself at the meeting. Apparently the idea had not made a very deep impression, as only three other young men came along. After being told a little about the aims and objects of the movement it was duly resolved to do something about the matter, and, armed with the responsibility of a worthy objective, the four sallied forth. This resulted in a meeting of 13 prospective members and the formation of a club, and from that day onward continual enlightenment has replaced my wondering, and I can say with confidence and pride that I shall never regret my association with this great movement.

Let me take you back to an address delivered by Mr. A. C. Cameron (then president) at the annual meeting of the Federation in 1937. In this address, he says: "Statistics show (and my informant is a leading New Zealand educationalist) that 75 per cent. of the

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young fellows going on to farms today have no secondary school education. Of that 75 per cent., a great many have not in the past qualified for the sixth standard proficiency examination."

Even allowing for an improvement in these conditions it must still appear an outstanding fact that many boys have a definite handicap in their work and the opportunities of life.

The work of the movement is both spiritual and material, cultural and practical, and, in effect, will be responsible for the re-habitation of the land. It improves the mind and the body, and, as a result, an improvement in farm management, the breeding of stock and other matters relating to farming is to be expected. A better community must arise, and this is a monument we can justly be proud of.

As for the popularity of the movement, one is not left doubting. Ever since the first efforts were made in the South Island about six years ago a steady growth rate in the membership figures has been maintained—a sure indication. Today, the record is close on 200 clubs and 6,000 members—truly fitting appreciation of the work done by the founders of the movement.

Club work is most interesting, and one of the greatest handicaps being gradually overcome is the inability of persons "to say what they think." It is common knowledge that much has been lost in the past through people being unable to express themselves in words.

The organisation is our own, being controlled by the members themselves —a virtue indeed. In the various capacities of office, an experience which in many cases would never otherwise occur in a lifetime, falls the lot of perhaps outstanding talent. This hidden ability immediately accepts the challenge of opportunity, and another leader enters the field. One of the objectives of the movement is to develop leadership, and so, early in the history of the society, it is apparent that "finds" are, literally, being unearthed in profusion. The office-bearers naturally have the greatest opportunity to show these qualities, but the main objective is to develop the interest and capabilities of the whole club, and for members, in fitting themselves for the advancements which offer, there is ample interesting material.

By no means the least are the rules governing a well-conducted meeting. Again, a chance offers itself with a short speech or debating, and at question time when a speaker is present or practically at any time. In the field, stock judging and demonstrations are of great importance, and open up an extensive branch of study, while cropping, pastures and many other things come in for consideration, the importance of any particular subjects, of course, depending on the individual.

Away from club meetings, field days hold pride of place. What important affairs they are—and rightly so, too. Everyone is striving to make this one the best ever, arranging for everything in detail, having some special attractions, and seeing that everyone is well catered for. This is how the young fellows tackle their work, and, in addition, it is interesting to note the way they regard their society—as an honourable and dignified institution and referred to at all times with the greatest of pride. Another opportunity which presents itself to the ability of the Young Farmer is election to the District Committee, and from there on to one of the four Councils, and lastly to merit a seat on the Dominion Executive, possibly as Dominion President.

With this great movement it is imminent that many with outstanding ability will become specialists in this great industry, but, in the main, it will give the average chap a new avenue of thought and a chance to spend his leisure time more profitably. For the young man on the farm isolation is now a thing of the past, and a renewed thing of life has fallen to his lot.

From a cultural point of view, sporting and social events play a very important part in our work, and they have resulted in the building of friendships, many of which will be life long. In my own club I am now intimately associated with several whom previously I knew only well enough to say good-day to. From this aspect alone I feel a great service is being rendered.

I am bound to say that our movement is receiving the greatest assistance from farmers and others interested in the land, and it is obvious the Y.F.C. movement will not fail through lack of support from this direction. Also, one must refer to the assistance being rendered by the Fields Division of the Department of Agriculture. As district secretaries, the officers of this Department are doing excellent service, being both efficient and willing to help all they can. Officers of other Departments often offer their services for our benefit, and the help they give is appreciated.

The movement is doing a great service to the rural community and the country, and is not to be underrated. It is deserving of the respect of every man, young or old, who has any interest in the land at all, and may I ask, "Who hasn't?"

The spade work has been done. The organisation has consolidated, and, with the experience of the past and the backing at our disposal, we can confidently face the future as we march—ONWARD!

Poverty Bay District Field Day

J. L. MUNRO, Chairman, Poverty Bay District Committee.

A FIELD day organised by the Poverty Bay District Committee was held at the Gisborne A. and P. Showgrounds on December 9. Although the attendance was very good, many Y.F.C. members were unable to attend due to the busy time of the year. The proceedings began in the morning with a thatching demonstration given by Mr. Huia Cooper, a member of the Gisborne Young Farmers' Club, and was followed in the afternoon by various stock judging competitions, and dog trials. A post-mortem examination on a diseased cow was conducted by Mr. E. R. Alexander, Government Veterinarian, together with Mr. F. R. Bould, Stock Inspector and members of the Livestock Division, Department of Agriculture.

At the close of the stock judging competitions the judges placed the animals, giving their reasons for doing so, and answering numerous questions.

During the afternoon tea interval Mr. J. L. Munro, chairman of the District Committee, thanked the judges and all who had lent stock for the occasion, and expressed appreciation of the asistance given by the Poverty Bay A. and P. Association and members of the Department of Agriculture. Mr. E. M. Bates, District Secretary, congratulated the Young Farmers on their successful field day.

Luncheon, morning and afternoon tea were provided by the Gisborne

Y.F.C., which also held a dance in the evening.

The winers of the judging competitions received challenge cups and miniatures. The challenge cups were kindly donated by the following:—

Beef Cattle.—Gisborne Young Farmers' Club. Dairy cattle: Kia Ora Co-operative Dairy Co., Ltd. Romney sheep: Mr. R. D. Dymock. Pigs: Gisborne Branch, Women's Division of Farmers' Union. Fat lambs: Mr. Ronald Graham.

Results of Events

Results of the events were as follows:—

Dog Trials (Judge, Mr. D. Cranswick).—B. H. Smith's "Bill," 1; P. Livingston's "Tweed," 2.

Aberdeen Angus Beef Cattle Judging (Judge, Mr. G. V. Smith).—S. Smith (Tolaga Bay), 1; J. Tietjen (Gisborne), 2; I. Sutherland (Gisborne), 3.

Dairy Cattle Judging (Judge, Mr. N. Burrows).—J. Dymock (Te Karara), 1; G. W. Smith (Gisborne), 2.

Romney Sheep Judging (Judge, Mr. E. R. Black).—J. Dymock (Te Karaka), 1; W. Sutherland (Gisborne), 2; P. Livingston (Gisborne), 3.

Baconer Pigs Judging (Judge, Mr. H. A. Hopkins).—S. Smith (Tolaga Bay), 118 points, 1; G. W. Smith (Gisborne), 103 points, 2; G. H. Cooper (Gisborne), 90 points, 3.

Fat Lamb Judging (Judge, Mr. F. Hair).—D. Lange (Gisborne), 125 points, 1; J. Dymock (Te Karaka), 120 points, 2; R. W. Smith (Gisborne), 100 points, 3; K. W. Cooper (Gisborne), 90 points, 4.

National Centennial Y.F.C. Tree Planting Scheme

ATTENTION is further directed to the article which appeared in the Y.F.C. section of the November number of the "Journal of Agriculture," pages 448 and 449. The article dealt specifically with the Y.F.C. tree-planting scheme, and secretaries are requested, if they have not already done so, to bring this matter before their clubs.

It is necessary to have information, at an early date, as to which clubs are entering into the scheme, and what they are prepared to undertake; an indication of the number of trees required will also be necessary.

Individual clubs should decide as soon as possible what they will be doing in this matter and then communicate with their District Secretary (Instructor in Agriculture), who will forward the details with the orders for trees to the respective councils, who will pass them on to headquarters.

Although the planting season is not for several months yet, it will be realised that orders for trees must be sent in without delay so that some idea of requirements may be estimated. Full details of the work being undertaken should accompany the order, which, as mentioned above, should be sent in through District Secretaries.

Among the Clubs: Reports on Activities

Owing to the fact that most of the South Island clubs have been in recess during the summer months, largely on account of seasonal work, etc., very few reports of meetings are available. Benzine restrictions and war conditions as a whole have had an effect on many of the activities of the organisation, but during this month, when the annual meetings of the clubs will be held, it is expected that a stimulus will be given to the movement generally, particularly when it is realised how great a part the clubs and members themselves can play in the maintenance of production. In connection with reports of meetings, club secretaries are requested to send these in to their district secretaries as soon as possible after each meeting in order that there may be no delay in their publication in these pages.

Western Southland.

Dipton.—General business followed by a discussion on ways and means of increasing the club's membership.

Dunedin, South Taieri.—Discussion on matters of general club interest.

South Canterbury.

Geraldine.—The decision made to take part in the Centennial Tree Planting scheme. A combined Women's Division of the Farmers' Union and Young Farmers' Club Picnic to be held at an early date.

Westland.

Murchison.—Silver Challenge Cup presented by Murchison Dairy Co. for Pasture Improvement Competitions. Trees to be planted in Dairy Company's grounds as a Centetnnial Memorial. Messrs. Gough, Gough, and Hamer, Ltd., arranged for a lantern lecture to be given on "Farmig Machinery." At a previously unreported meeting a discussion took place as to the best way to maintain production during the war, and a lecture entitled "First Aid on the Farm" was delivered by Dr. Dicker.

Wairarapa.

Carterton.—Welcome extended to the two West Australian Junior Farmers at present visiting the Dominion. Talks were given as follows:—"Synthetic Wool" (Mr. W. A. Iorns), "The Tour to Date" (Australian Junior Farmers), "Rambling Through America and Europe" (Mr. W. A. Iorns). At a previous meeting Mr. A. McKenzie spoke on "Royal Show Judging."

Masterton.—General business. A talk entitled "My Recent Trip to England" was given by Mr. James Andrew.

Manawatu.

Levin.—General. An interesting account of his recent trip abroad was given by Mr. M. C. Holmes.

Opiki.—Report read showing a good profit on the recent raffle. Decided to enter for some events at the Centennial Sports Meeting to be held shortly. Major B. A. Norman gave a lecture entitled "Life in the Army."

Oroua Downs.—Mr. E. A. Madden, of the Plant Research Bureau, gave an address on "Pasture Establishment."

Pohangina Valley.—A talk on "Top-dressing" was given by Mr. H. de O. Chamberlain, Department of Agriculture.

Rongotea.—Decided to hold another church parade. A committee (F. Dear, J. Gibbons, and R. Gloyn) met the delegates from Rongotea Horticultural Society in order to arrange special Y.F.C. root classes. Presentation made to Mr. R. Brown, a foundation member, on his leaving the district. Mr. A. J. Galpin spoke to the meeting on the Y.F.C. athletic meeting to be held at Palmerston North. A moving picture display was presented by Mr. L. Earl, Department of Agriculture.

Whakarongo.—Selected a team to represent the club in the district tug-of-war competition. Mr. H. de O. Chamberlain, Department of Agriculture, gave a talk on "Pastures."

South Canterbury.

Alton.—Mr. A. Taylor reported on the District committee meeting held recently. At a special club meeting it was decided that each member contribute a minimum of 1s weekly towards a fund formed to help the local members of the Special Overseas Force. Talk by Mr. Brown describing the experiences of his brother and himself on a cycling trip from Wellington to Auckland.

Hawera.—Mr. J. E. Davies, Department of Agriculture, outlined a plan in connection with the war effort to be carried out by the South Taranaki Y.F.C.

North Taranaki.

Inglewood.——Donation of £1 1s was made to the Patriotic Fund. Propose to enter three

teams in the Stock Judging competitions at the New Plymouth A. and P. Show. Invitation received from Inglewood Jersey Cattle Club to attend their annual Show and Field Day. Mr. J. McIntyre spoke on "The Most Interesting Features of the Courts at the Centennial Exhibition."

Midhirst.—A talk on "Pampas Grass" was given by Mr. G. A. Blake, Department of Agriculture.

Omata.—Arrangements made for Club dance. Tennis challenge accepted. Mr. Bell gave an interesting account of his recent tour abroad.

Rahotu.—General business. A talk entitled "My Tour Through Great Britain and Europe" was given by Mr. H. J. Kelly.

Tikorangi.—General business. Mr. P. Davidson, a Club member, gave an interesting address, his subject being "Goldmining at Waihi."

Toko.—Arranged for three stock judging teams to attend the New Plymouth A. and P. Show. Fixed a date for the Club's annual sports. Mr. R. Anderson, of Toko, spoke on his tour of Scotland and Canada.

Urenui.—Four teams were chosen to represent the club in the Stock Judging Competitions at the New Plymouth Show. Ararngements made for cricket matches with neighbouring clubs.

Southern Hawke's Bay.

Ballance.—Donation of £2 2s made to the Dannevirke District Committee.

Northern Hawke's Bay.

Wairoa.—Decided to enter a team at the Hawke's Bay Championship Rodeo at Napier if unable to compete at the Athletic Championships at Palmerston North. Mr. J. O'Grady spoke on "The Control of Blackberry by the Use of Goats." This proved to be a most instructive address, as Mr. O'Grady has proved most successful in his attempt to control the pest.

Eastern Bay of Plenty.

Taneatua.—Business meeting.

Waimana.—Discussion on Bay of Plenty Winter Show. Mrs. N. Clark gave a talk on her trip to Europe.

Western Bay of Plenty.

Kati Kati.—Decided to hold a club dance, the proceeds of which are to be donated to the Red Cross. The Club is to prepare a paper on some farm subject.

Paengaroa.—Donation of £2 to A. and P. Show and of a similar sum to Patriotic Fund. Arrangements for Annual Sports gathering. Accepted challenge from Pukehina Club to a cricket match. Mr. A. V. Allo, Department of Agriculture, spoke on "Feed Flavours" dealing in particular with the experiments now being conducted to control flavours in this district. An account of his trip to the Royal Show at Invercargill was given by Mr. C. Riddell.

Pukehina.—General business. Arrangements made for Club Dance. Field day held on Mr. W. Riddell's property, Paengaroa. Opening speech was made by Mr. T. Cammock. Mr. W. Riddell gave a demonstration of "Judging a Dairy Cow."

Te Puke.—Discussion on Farm Schools and Land Settlement schemes. Debating rules were also considered.

Waikato.

Hauraki.—Club members were asked to speak on "Keeping up Production in Time of War." The speakers all tackled the subject very well. Most of them pointing out that although farmers were helping their country in joining up they were also doing their part by remaining to manage farms. A problem section has been started. Fifteen minutes to be allowed at each meeting. The problem for this meeting was "Is a Heifer's Calf Worth Keeping?"

Te Awamutu.—Address by Mr. Spinley on his tour over Europe. At previous meetings talks were given as follows:—"Acts in Regard to Stock and Farms" (Mr. G. B. Melrose), "Original Farming Ideas" (Messrs. B. Walker and K. Fraser, 1st equal, and C. Nicholas 3rd). A debate held—"That Sheepfarming Takes More Management Than Dairy Farming." The affirmative won by 49 points. Field day held at Te Awamutu Pig Farm. Mr. R. Mandeno made the opening speech of the day, following which Mr. Webber conducted the party over the farm.

Auckland.

Harrisville.—Business meeting. Report of club dance showed a profit of £8 5s 4d.

Franklin.—Discussed baconer competition at forthcoming Waikato Winter Show. Arrangements for Field Day and a Social Evening.

Warkworth.

Kaukapakapa.—Election of new Treasurer. Arrangements for a Field Day to be held. Talks were given as follows: "Manurial Problems in North Auckland" (Mr. P. S. Syme, Department of Agriculture), "Fat Lamb Competition at Southdown Freezing Works" (Mr. R. Drinson), and "Observations at Field Day Held at Southdown Freezing Works" (Mr. B. Hooper).

Tobacco Notes

Curing Kiln-dried Tobacco

TO lay down any hard and fast rule for the curing of kiln-dried cigarette tobacco is hardly feasible, as so much depends on the variety grown, the soil in which it is grown, and the climatic conditions before and during the ripening period of the crop. Furthermore, two growers' kilns are seldom alike, either in size, ventilation, or heating arrangements.

In the early part of a normal season, with an average-sized kiln filled with leaf of an even ripeness, if the curing chart compiled by the Department of Agriculture is followed reasonably closely good results should be obtained. These charts may be obtained on request.

An American author, dealing with the important subject of curing, states that one can only become a good curer by practical experience, and that every "new chum" grower must expect to spoil one or two kilns of leaf at least before gaining this knowledge. Unfortunately, there is a lot of truth in this statement.

Experience Necessary

In New Zealand an average-sized kiln contains approximately 900 lb. of cured (dried) leaf, worth anything from £50 to £80, according to quality and market demand. If a beginner is going to spoil two kilns before becoming experienced, he is going to buy his experience dearly. Therefore, it is advisable for a grower about to put a cure through for the first time to obtain the assistance of a thoroughly experienced neighbour handling the same variety of leaf until such time as he knows the danger signals to watch for and the various tricks of the kiln.

The main points to remember in curing are:—

(1) To pick and load a kiln in the one day.

(2) To fill the kiln with leaf of the one variety and even ripeness.

(3) Not to overload. If the leaf is too tightly packed in the racks, when the temperature is raised to fix the colour and dry out the web of the leaf, quick evaporation is not possible and sponging invariably follows.

(4) Watch the temperature closely throughout the cure and prevent fluctuations of more than a degree or so for any period over 15 minutes once the ventilators have been opened, and until such time as the temperature has remained at 160 deg. for at least two hours.

(5) Always crack the top ventilators four to six hours or more before the bottom ones. When cracking alternate bottom vents and top vents should be open approximately 6 inches, and opened from then on in the usual way.

When artificial humidity is required, sacks saturated with water and placed over the kiln flue is the safest and most reliable method. The flooding of the kiln floor, whether of concrete or earth, should never be adopted except in cases where reconditioning of already cured and dry leaf is necessary.

—*U. A. YELDHAM, Dept. of Agriculture, Wellington.*

Health Notes for the Farm

Contributed by the Department of Health

Safeguarding the Health of the Mother

Our house is usually neat,
With things where they belong:
The plants are green and blossoming,
And not a thing goes wrong.
The clocks are always ticking,
The dog is always fed.
The kitchen always tidied up,
Meals punctually spread.

But now it doesn't look the same,
No-one can find his things;
The plants are brown, and every day
Some new disaster brings.
The clocks are sadly silent,
The dog looks gaunt and drear.
The kitchen is a crock'ry heap—
Cold dinner things taste queer.

You'd like to know what turned the trick?
I'll tell you—simply Mother's sick!

—*ETHEL A. CASE, in "Hygeia."*

AN intelligent knowledge of one's own body that conduces to maintain it at a satisfactory state of health is of supreme importance in the interest of the home and the community. Where the lamp of health burns well life is best.

Home-making is among the most natural and most persistent of human instincts, and there is no better heritage to carry through life than the memory of a happy home circle. This is enhanced where the mother, by her intelligence and wisdom, maintains her body at a high standard of health, for it should be borne in mind that if a mother keeps her body in good physical condition her high degree of health will give her the necessary fighting power.

The brain and the nervous system control the body, but the brain needs good, healthy blood—just as much as the muscles or other parts of the body. There is a close relationship between a healthy body and a normal healthy mind.

Discontent is undoubtedly very often the consequence of wrong conditions in the body, and although worry, melancholy, peevishness, and fear generally appear as arising from outward conditions, there may be real physical sources existing in the body itself. A person who is physically ill is likely to be ill-satisfied with everything without suspecting the fundamental cause of discontent.

Busy Looking After Family

The trouble with the average mother is that she is so busy looking after her family that she is often liable to neglect looking after herself, with, in many cases, disastrous results not only to herself but maybe to her family.

With the mother the family comes first, and she fits in as best she can and arranges accordingly. As one mother writes:

"Being mother is far the most important job in the world, and nothing else compares with it or comes anywhere near it. The children are so dependent on mothers. It matters so enormously how children are mothered. They are so little and so helpless at first, so responsive as they grow. Their whole future is in a mother's charge."

It is because of this that it is important for mothers to keep themselves up to the mark physically and mentally. It is difficult for some to be well and keep well, but much can be done by making up one's mind and keeping it made up to be so. If a person is determined to be well and keep well she will find that the determination goes a very long way in keeping oneself well. Was it not Robert Louis Stevenson who asked for the boon of "courage, gaiety, and a quiet mind"?

Plan Economically

It is necessary for a mother to conserve her energy. Things should be planned in the most economical way—the way which gives the very best results with the least possible effort. Most of us give ourselves work by lazy planning. For instance, spare no pains to train a baby in clean habits. Children are largely creatures of habit. Take a nap or a complete rest during the day, even if it is only for 10 or 20 minutes—"rest and be thankful," as we read on public seats placed about Wellington by some thoughtful benefactor. Adequate sleep is a repairing balm. Do not try to do more than one is really able. If something has to go, make up the mind to let it go and do not undo the good of letting it go by worrying about it.

"Don't try to do the impossible, my dear," remarked a shrewd friend to a bride of a few weeks' standing, "you will make a terrible mistake if you let your husband think you can keep the house on nothing." From childhood children should be trained to help and be tidy.

Curriculum For Girls

"The fact is," wrties Max O'Rell, "that if I were the Minister of Education in my country, with the full power to impose upon schools the curriculum I like, I would have every girl in the land to know the following things, absolutely regardless of her occupation or position in life. She should know that twelve pence make a shilling exactly. She should know how to cook, how to arrange every room of a house, how to make a dress, and how to be indispensable in a sick-room, and I would therefore have her taught housekeeping, cooking, dress-making, and nursing."

Also, according to Christopher Morley:—

"The man who never in his life
Has washed dishes for his wife,
Or polished up the silver plate,
He still is largely celibate."

Then, if possible, the mother should take a holiday at least once a year, as a change of scene is often very beneficial. One of the best antitodes for mental and physical dullness, provided this does not arise out of definite illness, is to be found in a vacation that will offer a change of environment.

Lack of Balance

Let leisure have a place in life. Often it is not work that is responsible for nervous breakdowns but the lack of balance to the work, faulty recreational habits, not enough outdoor exercise, insufficient sleep, and the absence of interest in something that is worth while doing.

Frequently the cause lies in surrendering to anxieties, fears, and obsessions instead of casting them out in the open where, in the full light of day, they are found to be ridiculously insignificant and unimportant. In the lines of a familiar song, "Pack up your troubles in your old kitbag, and smile, smile, smile." These are brave words, and they offer the finest kind of resistance to many nervous maladies and mental ill-health. A gallant attack and not a retreat has warded off many a nervous disturbance.

But there are many things that cannot be smiled away. One cannot smile a root abscess out of one's jaw. One cannot smile away one's weak feet or stooped shoulders or defective eyesight. So go to the doctor and find out the cause; there is sure to be one, and the sooner it is removed the better. Backache, for instance, may be purely muscular, caused by the body being thrown out of its proper balance by flat feet or wrongly-constructed shoes.

Wholesome Meals

It should hardly be necessary to stress the importance of regular, wholesome meals. Some mothers are apt to neglect themselves in this respect in their concern for the welfare of others. It is a good scheme to drink plenty of water, unless otherwise advised for medical reasons. Finally, do not think too much about your health or think the wrong way. Some people seem perpetually sorry for themselves. Avoid that state of mind. Learn how to keep fit and well; do not worry about disease when you are well.

You cannot charm, or interest, or please,
By harping on that minor chord, disease.

Are Your Children Ready For School?

WITH the opening of a new school year, our thoughts naturally turn to the health of the young children who will begin their school career. The number of children entering school with correctable physical defects, faulty health habits, and other causes responsible for poor classroom work should stimulate parents to see that their children's health condition is satisfactory when they trip off with "their satchel and shining morning face" to answer the call of the first school bell.

The problem is more than the mere correction of abnormal conditions just before school begins; it is the problem of intelligent health supervision from the earliest moment of life.

With adequate pre-natal care and thorough supervision during infancy, children two years of age should be free from preventible health handicap. That means that they are in a good nutrition, have sound teeth, sleep and rest regularly, eat plenty of the right kind of food, and play happily and vigorously out of doors in the sunshine.

Origin of Defects

Our responsibility during the next few years is to capitalise on this excellent start by bringing him up to school age in such condition that there is not the anxiety and need for hurried correction of defects. The points to bear in mind during this intervening period between infancy and school age are, that:—

(1) His regular health habit regime is continued.

(2) He still sleeps and naps regularly, continues to enjoy his meals, and welcomes the wholesome outdoor play and companionship of other children.

(3) He has prompt and adequate medical attention during illness.

(4) His environment is controlled to prevent harmful influences from affecting his development, such as faulty heating and ventilation of the home, prevention of needless exosure to infections (common cold included), etc.

(5) He receives regular dental supervision.

Our Responsibility

Experience shows that many of the defects of school children have their origin during the first six years of life; thereafter, how important it is for parents to train their children in the laws of health. Long before the time has come for entrance to school every normal child should be perfectly adept at putting on his own clothes. All children should be trained early in independence and self-care. When they enter the primary school and begin to climb the steep hill of academic learning their social education should be well advanced.

If the education of the young child has been thorough and successful, the day he goes to school his mother should be able to say to herself: "My child is physically and mentally healthy, his body is straight and strong, he sees and hears well, his teeth are sound and well kept, his nose and throat are in a healthy condition, he has good habits of eating and sleeping, he is independent of outside assistance in looking after his possessions and in self-care generally, he is self-reliant, will adapt himself to his new life without my help, and he is ready and anxious to make new friends and playmates."

The Farm Home and Kitchen

Contributed by the Association for Country Education

Home-drying of Fruits and Vegetables

DRYING is an important means of preventing the loss of perishable foods. It preserves them by removing so much of the moisture that the remaining juices in the food are too concentrated to permit of the growth of moulds and bacteria. It has the advantage that the food is reduced in bulk both through shrinkage and by the removal of inedible parts, and also that, once dried, it can safely be stored in inexpensive containers.

All foods cannot be dried to advantage, but all fruits rich in sugar, and a few of the vegetables, can be dried satisfactorily.

In general, the more rapid the drying the greater the preservation of flavour and cooking quality, but high temperatures cannot be used, as the cell membranes would burst and the juice would ooze out, thus destroying flavour and lessening food value.

Success in Drying

Success in drying depends upon:—(1) The use of suitable means of stopping the series of destructive changes which begin as soon as the food is cut into pieces and exposed to the air; (2) the employment of a temperature sufficiently high to prevent the growth of organisms, but not so high as to burst the cells and lose the juices from fresh material, or to scorch the partially dried; and (3) the provision of an adequate circulation of air in order to give prompt removal of the water vapour given off.

Wherever climatic conditions make it possible, sun-drying is the least expensive method of preserving foodstuffs. The trays of foods must be covered with butter muslin or mosquito netting to prevent contamination by dust and insects. A home-made glass-covered solar dryer, however, is easily made from an ordinary window pane placed at an angle over the trays of food. To exclude insects, etc., it is best mounted on a frame with ventilation slots at the top and bottom covered with wire gauze or perforated zinc.

Making a Dryer

Artificially-heated dryers can be made for use above any ordinary stove or an electric or kerosene heater. It is necessary, of course, that they should be well insulated in any places where they may come in contact with a hot surface (e.g., the legs, if the dryer is to stand on a coal stove). Any strong but light box can easily be made into a dryer.

The bottom should be removed and the side taken off and replaced with hinges. Ventilation spaces must be cut at the top to allow the water vapour to escape, and cleats nailed on the inside to support the trays or racks. Well-insulated legs (metal or asbestos) should be provided, as described above, when necessary. The dryer is completed with a number of shelves with perforated bottoms (wire, gauze, perforated zinc, fine wire netting, wooden slats, etc.) to fit inside.

Sulphuring

In the case of most fruits it is found necessary to give some kind of treatment to prevent discoloration during preparation and drying. Immersing the peeled or otherwise prepared fruit in salted water until it actually goes into the dryer is moderately satisfactory, but for real preservation of the colour and flavour sulphuring is usually adopted. It also checks souring and insect attacks. Although this process has been subjected at times to severe criticism, it has never been shown to be injurious to persons consuming the products, and the decision as to whether to sulphur or not is a matter to be left to individual preference.

Sulphuring merely consists of burning sulphur under a stack of the trays of prepared fruits (with a brick between each tray to allow the fumes to circulate). The stack of trays is covered by a large box to keep the fumes in, and the sulphur is burnt in an old iron saucepan or other strong container. This is, of course, done out-of-doors to prevent annoyance from the fumes.

Peeled fruits are usually sulphured for 15 to 20 minutes, and unpeeled for up to one hour. Sulphuring is complete when the juice begins to collect in the stone cavity (the fruit having been halved and the stone or core removed, and placed cut side up on the shelves).

After sulphuring is complete the trays should be removed and placed in the dryer, care being taken not to pour out any of the juice which has been collecting in the stone-cavity, as this is rich in sugar and flavour.

A thermometer must be used in drying to secure the best results. It is placed on the bottom shelf in the dryer, and the position of the shelves constantly changed so that all may dry alike.

How to Dry Fruit

ALL fruit used for drying should be mature, but not soft, and should not be bruised. The firm-fleshed rather than the watery varieties are preferable for drying.

Apples.

Peel, core, and slice the apples (slicing is better than quartering, as the slices are even in thickness and thus dry more quickly and evenly). Drop at once into salted water or spread on trays to a depth of 1 to 1½ inches, and put on to the sulphuring box and sulphur for 20 to 30 minutes. After drying the fruit if it has been immersed in water put into the evaporator and begin drying at 130 deg. F. Allow the temperature gradually to rise until 175 deg. has been reached. Stir the fruit occasionally with hand. It will be done when it is so dry that a handful squeezed in the hand has an elastic, springy feel and separates promptly when the pressure is released, leaving no visible moisture on the hand.

Pears.

Bartlett pears are suitable. The pears are picked while still firm and allowed to ripen for a week in boxes. They may be peeled, cored, and sliced and treated exactly as apples, or they may merely be split and dried in halves. Sulphuring for pears should be longer than for apples, as they greatly tend to discolour and lose flavour. One to two hours is recommended.

Peaches.

Firm, yellow-fleshed peaches dry best, and should be picked when ripe but not soft. The fruit may be peeled or not, as preferred, but it must be cut in half and the stone removed. If sulphured, sulphur for 15 to 20 minutes in a single layer with the stone-cavity uppermost. Then proceed as for apples, starting at 130 to 140 deg. for the first few hours, and gradually rising to 165 deg. for the last two or three.

Apricots.

The fruit should be picked while firm, halved and stoned without peeling, and sulphured for 1½ to 2 hours. As with peaches, be careful not to lose the syrup which will collect in the stone-cavities.

Cherries.

The fruit should be washed and picked over and spread in a single layer and placed in the dryer without sulphuring. The temperature must be kept very low—120 deg. to begin with —and must never rise above 150 deg., as cherries especially are easily injured by overheating.

Berries.

Blackberries, raspberries, and loganberries can be dried only if firm, slightly under-ripe berries are used. Pick them in the early morning before they are heated by the sun, and pick into shallow vessels so that there may be no crushing of the berries in handling or packing. Dry the same day that they are picked. Spread evenly on the trays (not more than two berries deep if soft enough to crush with greater weight), and put into the dryer at once. For blackberries, start at 135 to 145 deg. and allow to rise to 150 to 155 deg., when the fruit is about half-dry. Loganberries and red raspberries should be started at 130 deg. Other berries do not dry to advantage.

Prunes.

The prunes should be allowed to become fully ripe, and to fall from the tree of their own accord. Only sound fruit should be used. To remove the wax from the skin and to form minute cracks in it, prunes must be dipped in boiling caustic soda (1lb. soda to 10 gallons water) for 30 to 40 seconds. An old bucket perforated with holes is used for the dipping and for the immersion in cold water which follows to wash off all traces of the caustic soda. If the dipping has been done properly there should be very minute cracks running through the skin, but not open cracks, and no peeling of the skin.

Prunes burst very easily, and therefore must be heated very gradually, 130 deg. being desirable for the first three or four hours, and after that the temperature should never rise above 140 deg. until the skin begins to wrinkle, when it may rise to 175 deg.

Plums.

Plums of the large fleshy varieties, such as Satsuma and Burbank, should be dried like peaches or apricots.

Drying Vegetables

CERTAIN vegetables can be dried, but on the whole it is better to bottle such perishable foods as green peas, french beans, celery, cauliflower, etc., and to pit all the roots. Onions can, of course, be stored in a dry, airy place.

Green Peas.

Green peas can, however, he dried if the following directions are carefully followed:—

The peas should be in an ideal condition for table use—i.e., when the peas are full-sized but the pods have not yet begun to turn yellow or shrivel (e.g., more mature than for bottling, which must be done while the peas are definitely young and tender). Shell by dipping the pods in boiling water for three minutes and rubbing them over a fine netting wire sieve. The peas will fall through into the trays beneath.

Place the peas in a wire basket and immerse them in boiling, salted water for three to five minutes. Remove and dry them, and spread them at a depth of ¾ to 1 inch on the drying trays. Start at a temperature of 115 to 120 deg. and allow to rise gradually to 145 deg. Stir occasionally when drying. Test the peas to see if they are properly dry, when they should be uniformly dry throughout, showing no moisture near the centre when split open.

Mature Beans.

Mature beans may be shelled, dipped for five minutes into boiling water, and dried, starting at about 150 deg. and rising to 175 deg.

Conditioning

AFTER drying is complete, and before the dried fruits are packed away in boxes or paper bags, they must be conditioned, i.e., allowed to remain at room temperature with air circulating around them. This is done by placing them loosely in a large, open bin or boxes, or on a clean surface and turning them over at intervals for a week or 10 days. This evens up the drying, and brings the food into an ideal condition for storage.

Unless this conditioning is done the whole of the previous work may be wasted through certain pieces retaining moisture and going mouldy after the food has been tightly packed, and thus ruining the whole sample.

After conditioning, which is an essential step in drying, the foods should preferably be stored in light and insect- and vermin-proof containers, e.g., heavy paper bags, tins, cardboard or wooden boxes, etc. Cracks and joins in boxes and tins can be sealed by the use of adhesive paper or tape. The seal does not need to be airtight, and, in fact, it is preferable for it not to be, as the food keeps better when it is able to absorb or give up moisture in perfect balance with the atmosphere.

—With acknowledgements to U.S. Department of Agriculture bulletin on "Farm and Home Drying of Fruits and Vegetables"

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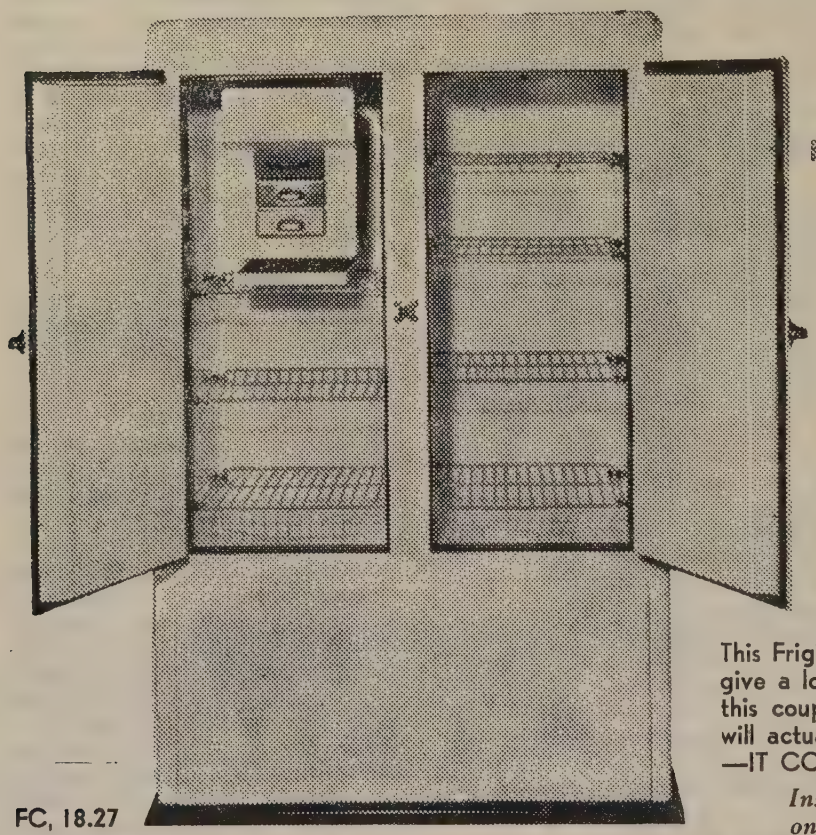

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Preserving Recipes

Grape Jam.

6lb. grapes (use some under-ripe)
1 cup water.
3-4½lb. sugar (depending on sweetness of grapes)

Method.—Remove the grapes from the stalks and press the pulp from the skins. Boil the pulp until it is tender, and pass it through a colander to remove the seeds. Meantime, cook the skins in the water, and, when tender, drain them well and chop them and pass them through a mincer. Add the minced skins to the seedless pulp and weigh. Allow ½ to ¾lb. sugar per lb., depending on the variety of grape. Cook until clear and thick, and bottle at once.

Grape Conserve.

6lb. grapes
2lb. sugar
2 large oranges
1lb. finely-chopped walnuts.

Method.—Prepare pulp and skins as described above, and add them to the chopped orange pulp, and a quarter of the peel finely shredded. Cook this mixture slowly for 20 minutes, then add the sugar and boil rapidly until it becomes very thick (220 deg. F.); then add the chopped nuts and boil a little longer (five or 10 minutes). Remove from the fire, cool slightly, stir, pack into hot jars, seal, and cook these in boiling water for 15 mintues.

Preserved Figs.

6 quarts figs
4lb. sugar
3 quarts water
1 cupful baking soda
6 quarts boiling water.

Method.—Select firm, sound fruit, discarding all over-ripe or broken fruit. Springle the soda over the figs and pour the boiling water over them. Allow them to stand for 15 minutes, and then drain well and rinse in two baths of clean, cold water. Let the figs drain in sunshine, if possible, until the syrup is ready. Mix the sugar and the three quarts of water and boil for 10 minutes, then skim. Add the well-drained figs gradually so as not to cool the syrup. Cook until the figs are transparent, then lift them out carefully and place them in shallow vessels. Boil the syrup until it is as thick as honey, and pour it over the figs, being sure that all are covered. Next day, pack hot jars with the cold figs (stem ends upwards). Pour the syrup over, put lid on loosely, and put the jars into a water bath. Heat the water gradually and cook for 15 minutes at boiling temperature. Remove and tighten lids and store away.

Figs may be peeled by hand, and in this case only a few can be cooked at a time in the syrup; otherwise they will break. Lift them out as they are done on to shallow plates and put them in the sun to plump, meanwhile adding more figs to the syrup. When all are done, boil the syrup till it is as thick as honey, put all the figs back into it, boil for five minutes, and then let stand in a covered dish overnight, and continue as already described.

Fig Jam.

3lb. figs
1½lb. sugar
Juice of 2 lemons
½ cup water.

Method.—Treat the figs with soda or peel as described above. Mash the figs or put them through a colander. Put into a saucepan and add the lemon juice and half a cup of water, and bring to the boil. When boiling well, add the sugar and cook rapidly until thick (221 deg. F.). Pack into jars and cook in water bath for 15 minutes.

Preserving With Honey.

Bottling.—Honey may be used as a substitute for sugar in bottling. Use about 1¼ times the stated weight of sugar, and reduce the water to about one-quarter of the amount given. For example: 1lb. sugar and 4 cups of water would become 1¼lb. honey and 1 cup sugar.

Jams, Conserves, etc.—Allow equal weights of the fruit and of honey and proceed otherwise as for jam, but boil a little longer to remove the extra water in the honey.

BISCUITS FOR SCHOOL LUNCHES.

Nutties.

Brown sugar ½ cup
Butter ½ cup
Rolled oats 7oz.
Golden syrup 1 tablespoonful
Walnuts (chopped) ½ cup
Salt ½ teaspoonful
Vanilla ¼ teaspoonful.

Method.—Melt butter, add sugar, salt, syrup, vanilla, rolled oats and nuts. Spread in flat tin and bake in oven 350 deg. F.

Parkin.

Oatmeal 1lb.
Flour ¼lb.
Syrup 1lb.
Brown sugar ¼lb.
Dripping 6oz.
Soda ½ teaspoonful
Ginger 1½ teaspoonfuls
Nutmeg
Warm water 1 cup.

Method.—Melt fat and syrup, add dry ingredients, and stir well. (Add water or milk if too dry.) Pour into a greased tin. Bake in a cool oven for two hours. One hour at low and one hour stored heat. Peel or sultanas may be added if desired. (These biscuits are hard and chewy.)

Clifton Biscuits.

Walnuts ¼ cup
Flour 1 cup
Coconut 1 cup
Rolled oats 1 cup
Sugar ¾ cup
Butter ¼lb.
Golden syrup 1 tablespoon
Soda 1 teaspoonful
Boiling water 2 tablespoons.

Method.—Melt butter and syrup, pour into dry ingredients. Add soda and water. Put in dessertspoonfuls on a tray, press flat with the fingers and bake ¼ hour.

APPLE SAUCE ICE BOX DESSERT.

1 cup dry cake or cookie crumbs.
¼ cup powdered sugar.
1 cup whipped cream.
1 to 1½ cups apple sauce.
1 tablespoon lemon juice.
1 teaspoon vanilla.

Method.—Mix the finely-crumbed cake or cookies with powdered sugar. Fold this into the whipped cream, apple sauce, and flavouring. Chill in the refrigerator for one hour before serving. Berries or peaches may be used for this dessert cake.

BAKED APPLE, CREOLE STYLE.

Method.—Core and peel apples and cook in syrup till tender. Remove to serving-dish. Fill centres with jelly or marmalade and pour syrup over. Make a meringue with the white of one egg and sugar. Spread meringue on tops of apples and bake in a very moderate oven about eight minutes.

Table of Contents — March, 1940

Plough for Victory—*R. B. Tennent* .. 166

Avoid Waste on the Farm—*C. Walker* .. 168

Improvement of Hill Country Pastures by Cultivation—*N. Lamont* 175

Slaughterings of Stock—*Livestock Division* 179

Selecting a Seed Mixture—*P. S. Syme* .. 181

Give the Pigs Some Barley—*M. McG. Cooper* 185

Boiling Water in Supplying Dairies—*Dairy Division* 187

Autumn Topdressing in Kaitaia District—*A. M. Lee* 193

Practical Points in Sheep Dipping—*J. E. Duncan* 197

Growing Linen Flax in N. Z.—*A. G. Elliott* 206

Certificate-of-Record Testing—*Dairy Division* 211

Control of Cockroaches—*J. Muggeridge* .. 213

Veterinary Notes—*Livestock Division* .. 215

Farm Practice and Management—*Fields Division* 218

The Orchard and Vineyard—*Horticulture Division* 223

The Home Garden—*Horticulture Division* .. 226

Apiary Notes—*Horticulture Division* .. 229

Poultry-keeping Section—*Livestock Division* 231

Young Farmers' Clubs—*S. Freeman, Editor* 233

Health Notes—*Department of Health* .. 238

The Farm Home and Kitchen—*Association for Country Education* 240

And Miscellaneous Matter.

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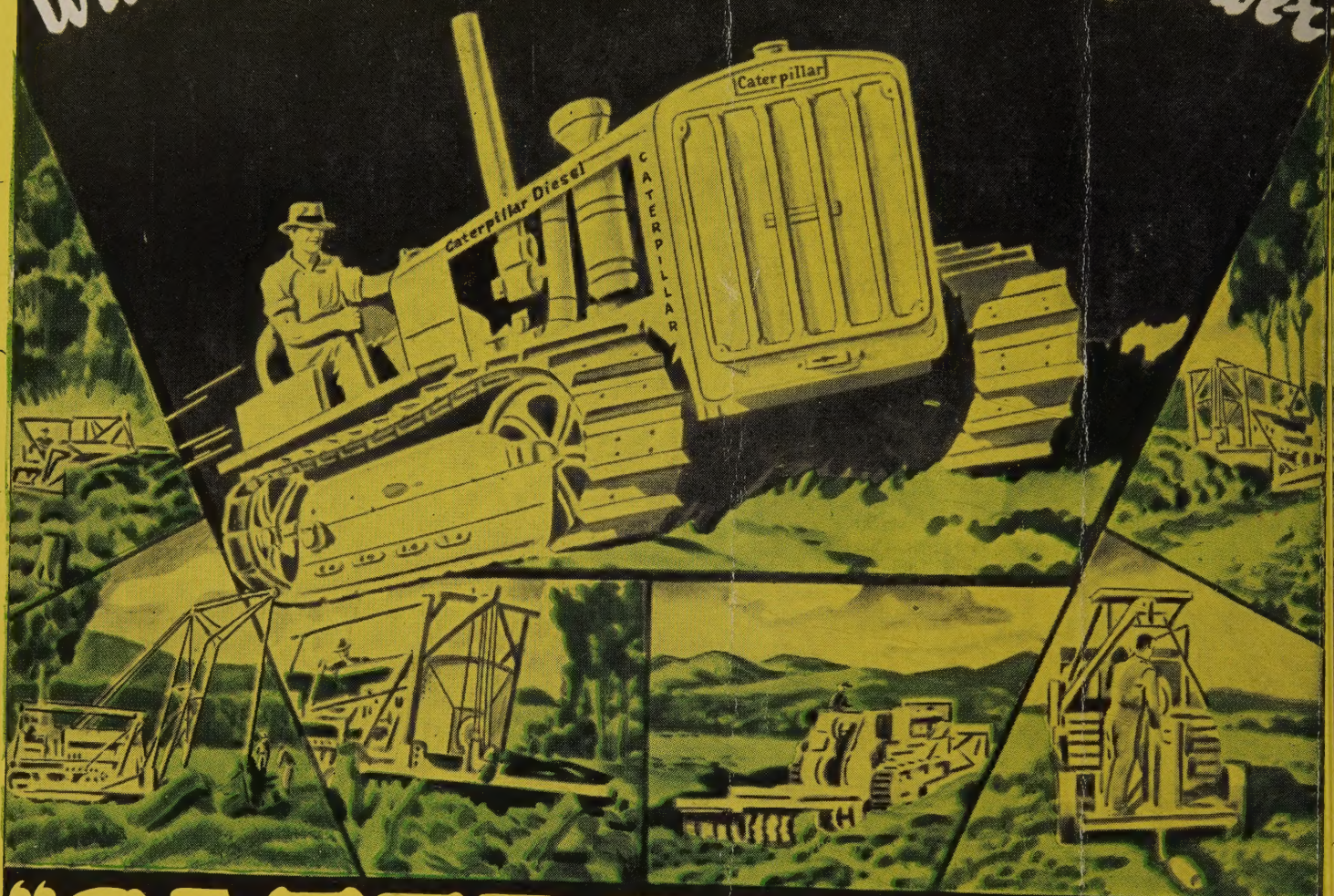

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